

59—17

Proceedings of the American Academy of Arts and Sciences.

VOL. 59. No. 17.—JANUARY, 1925.

RECORDS OF MEETINGS, 1923-24.

BIOGRAPHICAL NOTICES.

OFFICERS AND COMMITTEES FOR 1924-25.

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1. DURAND, ELIAS J.—The Genera Midotis, Ionomidotis and Cordierites. pp. 1-18. 2 pls. September, 1923. \$.80.
2. BAXTER, GREGORY PAUL AND SCOTT, ARTHUR FERDINAND.—A Revision of the Atomic Weight of Boron. The Analysis of Boron Trichloride and Boron Tribromide. pp. 19-48. September, 1923. \$.80.
3. LIPKA, JOSEPH.—Trajectory Surfaces and a Generalization of the Principal Directions in any Space. pp. 49-77. September, 1923. \$1.00.
4. PIERCE, GEORGE W.—Piezoelectric Crystal Resonators and Crystal Oscillators Applied to the Precision Calibration of Wavemeters. pp. 79-106. October, 1923. \$1.00.
5. BRIDGMAN, P. W.—The Compressibility and Pressure Coefficient of Resistance of Rhodium and Iridium. pp. 107-115. November, 1923. \$.50.
6. BRIDGMAN, P. W.—The Effect of Tension on the Thermal and Electrical Conductivity of Metals. pp. 117-137. November, 1923. \$.75.
7. BRIDGMAN, P. W.—The Thermal Conductivity of Liquids under Pressure. pp. 139-169. December, 1923. \$1.00.
8. BRIDGMAN, P. W.—The Compressibility of Five Gases to High Pressures. pp. 171-211. January, 1924. \$1.15.
9. SHAPLEY, HARLOW AND CANNON, ANNIE J.—Summary of a Study of Stellar Distribution. pp. 213-231. March, 1924. \$.70.
10. BAXTER, GREGORY P. and COOPER, WILLIAM C., JR.—A Revision of the Atomic Weight of Germanium. I. The Analysis of Germanium Tetrachloride. pp. 233-255. May, 1924. \$.75.
11. MARK, E. L.—Marine Borers in Bermuda. pp. 257-276. 4 pls. May, 1924.
12. CLAPP, W. F.—New Species of Shipworms in Bermuda. pp. 277-294. 3 pls. May, 1924.
Numbers 11 and 12 bound together \$1.65.
13. KENNELLY, A. E.—Some Properties of Three-Terminal Electrical Conducting Networks. pp. 295-311. July, 1924. \$.85.
14. WARREN, CHARLES H. AND MCKINSTRY, HUGH E.—The Granites and Pegmatites of Cape Ann, Massachusetts. pp. 313-368. 5 pls. September, 1924. \$1.75.
15. BRUES, CHARLES T.—Observations on Animal Life in the Thermal Waters of Yellowstone Park, with a Consideration of the Thermal Environment. pp. 369-438. 1 pl. November, 1924. \$1.50.
16. WILDER, HARRIS HAWTHORNE AND PFEIFFER, MARGARET WASHINGTON.—The Bodily Proportions of Women in the United States, Based upon Measurements taken from One Hundred Smith College Students. pp. 439-603. December, 1924. \$4.25.
17. RECORDS OF MEETINGS; Biographical Notices; Officers and Committees; List of Fellows and Foreign Honorary Members; Statutes and Standing Votes, etc. pp. 605-704. January, 1925. \$.75.



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RECORDS OF MEETINGS.

One thousand one hundred and twenty-fifth Meeting.

OCTOBER 10, 1923.—STATED MEETING.

The Academy met at its House at 8 P.M.

The PRESIDENT in the Chair.

There were forty-three Fellows and nine guests present.

In the absence of the Recording Secretary, the Corresponding Secretary was requested to assume his duties.

The Records of the Annual Meeting, of May 9, were read and approved.

The following letters were presented by the Corresponding Secretary: — from J. C. Arthur, C. L. Becker, Manton Copeland, L. C. Cornish, T. L. Davis, William Hovgaard, J. R. Jack, W. H. Lawrence, R. I. Lee, D. A. MacInnes, S. A. Mitchell, M. I. Rostovtzeff, E. C. Stakman, S. W. Stratton, Oswald Veblen, E. P. Warner, and Hans Zinsser, accepting Fellowship; and from Henri Guy, accepting Foreign Honorary Membership.

The Corresponding Secretary announced that an invitation for representation at the Joseph Leidy Centenary had been referred to the President with power.

The President announced the death of seven Fellows: — Louis Bell (Class I, Section 2); Louis Derr (Class I, Section 2); Rudolph Hering (Class I, Section 4); Raphael Pumpelly (Class II, Section 1); Stephen Paschall Sharples (Class I, Section 3); William Roscoe Thayer (Class III, Section 3); Arthur Gordon Webster (Class I, Section 2); and of one Foreign Honorary Member, John Morley, Viscount Morley of Blackburn (Class III, Section 3).

The following amendment to the Statutes, recommended by a special committee to which it had been referred, was adopted by ballot, twenty-eight votes being cast in the affirmative, and one in the negative:

Addition to Chapter II, Article 5 (at the end of the second para-

graph): "Any Fellow shall also be exempt from annual dues who has paid such dues for forty years, or, having attained the age of seventy-five, has paid dues for twenty-five years."

New members present were introduced by Vice-President Kennelly of Class I, and by Professor Parker of Class II.

The following communication was presented:

Mr. William S. Franklin: "Determinism in Biology and Indeterminism in Physics."

Seven papers were presented by title:

"A Revision of the Atomic Weight of Boron. The Analysis of Boron Trichloride and Boron Tribromide," by Gregory P. Baxter and Arthur F. Scott, presented by G. P. Baxter.

"The Compressibility of Five Gases to High Pressures," by P. W. Bridgman.

"The Compressibility and Pressure Coefficient of Resistance of Rhodium and Iridium," by P. W. Bridgman.

"The Effect of Tension on the Thermal and Electrical Conductivity of Metals," by P. W. Bridgman.

"The Thermal Conductivity of Liquids under Pressure," by P. W. Bridgman.

"The Joule-Thomson Effect in Air: First Paper," by John R. Roebuck, presented by P. W. Bridgman.

"The Occurrence of Cordilleran and other Western Plants in the Unglaciaded Areas of Northeastern America," contribution from the Gray Herbarium of Harvard University, presented by M. L. Fernald.

The Meeting was then dissolved.

One thousand one hundred and twenty-sixth Meeting.

NOVEMBER 14, 1923.—STATED MEETING.

The Academy met at its House at 8.10 P.M.

The PRESIDENT in the Chair.

There were thirty-eight Fellows and one guest present.

The Records of the Meeting of October 10 were read and approved.

The Corresponding Secretary announced the receipt of a letter of

acceptance of Foreign Honorary Membership from George Albert Boulenger; and of biographical notices of Edward Emerson Barnard, by E. B. Frost, and of George Lincoln Goodale, by Oakes Ames.

The Corresponding Secretary reported that the Council had appointed Edwin B. Wilson to be a member of the Committee of Publication, to fill the unexpired term of the late Louis Derr; and William M. Wheeler to represent the Academy in the Division of Foreign Relations of the National Research Council in place of the late A. G. Webster.

He also announced as the Committee on Methods of Electing Associates, Messrs. E. B. Wilson, W. C. Wait and Thomas Barbour.

The Corresponding Secretary reported that a meeting in memory of Professor Webster was to be held in Worcester on December 7, to which the members of the Academy were invited.

The President announced the death of two Fellows: — Samuel Walker McCall (Class III, Section 1); and Charles Proteus Steinmetz (Class I, Section 4).

The following communication was presented:

Mr. Samuel R. Detwiler (introduced by Mr. George H. Parker):
"The Transplantation of Limbs in Relation to the Development of the Nervous System," with lantern illustrations.

Two papers were presented by title:

"Marine Borers in Bermuda," by E. L. Mark.

"New Species of Shipworms in Bermuda," by William F. Clapp,
presented by E. L. Mark.

The Meeting was dissolved at 9.30 P.M.

One thousand one hundred and twenty-seventh Meeting.

DECEMBER 12, 1923.— STATED MEETING.

The Academy met at its House at 8.10 P.M.

The PRESIDENT in the Chair.

There were forty Fellows and two guests present.

The Records of the Meeting of November 14 were read and approved.

The Corresponding Secretary announced the receipt of bio-

graphical notices of Samuel Leonard Abbot, by A. C. Lane; James Mills Peirce, by W. E. Byerly; Charles Proteus Steinmetz, by A. E. Kennelly; and Robert Wheeler Willson, by H. T. Stetson.

On the recommendation of the Council, the following appropriations were voted:

\$200 toward the Annual Tables of Constants and Numerical Data, published under the auspices of the National Research Council.¹

\$56.23 for expense in connection with the restoration of the Rumford Monument at Auteuil.¹

\$500 for the expense of certain repairs to the House.

\$54.40 for the binding of publications of the Academy, to be sent to the University of Tokyo.

The President read a minute on the life and services of Professor Arthur Gordon Webster, as adopted by the Council.

The President announced the death of Charles Francis Jenney, Fellow in Class III, Section 1.

The following communications were presented:

Mr. Richard P. Strong: "A Flagellate Infecting Plants and its Animal Hosts," with lantern illustrations.

Mr. Emory L. Chaffee: "The Electrical Response of the Retina to Stimulation by Light," with lantern illustrations.

The Meeting was dissolved at 9.45 P.M.

One thousand one hundred and twenty-eighth Meeting.

JANUARY 9, 1924.—STATED MEETING.

The Academy met at its House at 8.10 P.M.

The PRESIDENT in the Chair.

There were forty-one Fellows and six guests present.

The Records of the Meeting of December 12 were read and approved.

The President announced the death of James Madison Morton, Fellow in Class III, Section 1.

The President announced that Volume 27 of the Proceedings of

¹ This charge was later assumed by the Rumford Committee.

the Academy was desired in order to complete the set of publications to be presented to the University of Tokyo.

The following communications were presented:

Mr. Allyn A. Young: "The Reparations Problem."

Mr. Charles Macfie Campbell: "Some Forms of Psychotherapy."

The Meeting was dissolved at 10.10 P.M.

One thousand one hundred and twenty-ninth Meeting.

FEBRUARY 13, 1924.—STATED MEETING.

The Academy met at its House at 8.05 P.M.

The PRESIDENT in the Chair.

There were forty-five Fellows and three guests present.

The Records of the Meeting of January 9 were read and approved.

The Corresponding Secretary announced the receipt of biographical notices of William Brewster, by H. V. Neal; and Silas Weir Mitchell, by W. W. Keen.

The Corresponding Secretary also announced that an invitation had been received from Presidents Angell of Yale, Butler of Columbia, and Hibben of Princeton, to join in the preparation of a volume of congratulatory letters to Ex-President Eliot on his ninetieth birthday, and that this invitation had been referred by the Council to the President with power.

The President announced the death of four Fellows:—Basil Lanneau Gildersleeve (Class III, Section 2); Joseph Lipka (Class I, Section 1); Jacques Loeb (Class II, Section 3); Woodrow Wilson (Class III, Section 1).

The President announced the appointment of Professor Norton A. Kent as Acting Corresponding Secretary for the remainder of the year.

The President presented an invitation from the University of Naples to send a representative to the celebration of the six hundredth anniversary of its founding, to be held on May 7.

It was

Voted, That the representative be chosen by the Chair; also that

the President appoint a Fellow of the Academy to write an appropriate reply in Latin.

The following communications were presented:

Mr. Charles H. Haskins: "Some Phases of Mediæval Science," with lantern illustrations.

Mr. R. Clipston Sturgis: "Forty Years of Architecture," with lantern illustrations.

The Meeting was dissolved at 9.25 P.M.

One thousand one hundred and thirtieth Meeting.

MARCH 12, 1924.—STATED MEETING.

The Academy met at its House at 8.15 P.M.

The PRESIDENT in the Chair.

There were thirty-one Fellows present.

The Records of the Meeting of February 13 were read and approved.

The President announced the death of Charles Warren Clifford, Fellow in Class III, Section 1.

On recommendation of the Council, the following appropriations were made for the ensuing year:

From the income of the General Fund, \$7,775, to be used as follows:

for General and Meeting expenses	\$600.00
for Library expenses	1,800.00
for Books, Periodicals and Binding	1,200.00
for House expenses	2,800.00
for Assistant Librarian Emerita	500.00
for Treasurer's expenses	875.00

From the income of the Publication Fund, \$3,416.20, to be used for publication.

From the income of the Rumford Fund, \$3,333.55, to be used as follows:

for Research	\$1,000.00
for Books, Periodicals and Binding	200.00
for Publication	600.00
for use at the discretion of the Committee	1,533.55

From the income of the C. M. Warren Fund, \$1,070.41, to be used at the discretion of the Committee.

The President appointed the Nominating Committee as follows:

Forris J. Moore, of Class I.

Reid Hunt, of Class II.

Ephraim Emerton, of Class III.

The following communications were presented:

Mr. Frederick A. Saunders: "Recent Advances in Spectroscopy."

Mr. Charles A. Coolidge: "Some Remarks on Chinese Architecture, and a Trip to the Ming Tombs," with lantern illustrations.

Two papers were presented by title:

"A Revision of the Atomic Weight of Germanium. I. The Analysis of Germanium Tetrachloride," by Gregory Paul Baxter and William Charles Cooper, Jr.

"Summary of a Study of Stellar Distribution," by Harlow Shapley and Annie J. Cannon.

The Meeting was dissolved at ten o'clock.

One thousand one hundred and thirty-first Meeting.

APRIL 9, 1924.—STATED MEETING.

The Academy met at its House at 8.10 P.M.

The PRESIDENT in the Chair.

There were forty-three Fellows and one guest present.

The Records of the Meeting of March 12 were read and approved.

The Acting Corresponding Secretary announced the receipt of biographical notices of Louis Bell, by A. E. Kennelly; and of Hermann, Graf zu Solms-Laubach, by B. L. Robinson.

On the recommendation of the Council, it was

Voted, That power be granted to the Library Committee to give certain medical pamphlets to the Boston Medical Library, and to dispose, by sale or gift, of certain duplicate books and broken sets of periodicals.

On the recommendation of the Council, it was

Voted, That the income of \$5,000, the amount of the Mills bequest, be appropriated for the use of the Committee of Publication.

The President announced the death of Thomas Corwin Mendenhall, Fellow in Class I, Section 2.

The following communications were presented:

Mr. George H. Parker: "The Carbon Dioxide Produced by Nerve."

Mr. W. J. V. Osterhout: "The Selective Action of Living Cells," with lantern illustrations.

Two papers were presented by title:

"Observations on Animal Life in the Thermal Waters of Yellowstone Park, with a Consideration of the Thermal Environment," by Charles T. Brues.

"Some Properties of Third-Terminal Electric Conducting Networks," by Arthur E. Kennelly.

At 9.50 the Meeting was dissolved.

One thousand one hundred and thirty-second Meeting.

MAY 14, 1924.—ANNUAL MEETING.

The Academy met at its House at 8.10 P.M.

The PRESIDENT in the Chair.

There were thirty-nine Fellows and two guests present.

The Records of the Meeting of April 9 were read and approved.

The President announced the death of two Fellows:—Ernest Fox Nichols (Class I, Section 2), and Theophil Mitchell Prudden (Class II, Section 4); and of one Foreign Honorary Member, Johannes Eugen Bülow Warming (Class II, Section 2).

The following report of the Council was presented:

Since the last report of the Council, there have been reported the deaths of nineteen Fellows:—Louis Bell, Charles Warren Clifford, Louis Derr, Basil Lanneau Gildersleeve, Rudolph Hering, Charles Francis Jenney, Joseph Lipka, Jacques Loeb, Samuel Walker McCall, Thomas Corwin Mendenhall, James Madison Morton, Ernest Fox Nichols, Theophil Mitchell Prudden, Raphael Pum-

pelly, Stephen Paschall Sharples, Charles Proteus Steinmetz, William Roscoe Thayer, Arthur Gordon Webster, Woodrow Wilson; and two Foreign Honorary Members:—John Morley, Viscount Morley of Blackburn, and Johannes Eugen Bülow Warming.

Seventeen Fellows and two Foreign Honorary Members were elected by the Council and announced to the Academy in May 1923.

The roll now includes 570 Fellows and 64 Foreign Honorary Members (not including those elected in May 1924).

The annual report of the Treasurer, Harold Murdock, was read, of which the following is an abstract:

GENERAL FUND.

Receipts.

Income on hand April 1, 1923		\$3,718.12
From Investments	\$4,961.31	
“ Assessments	3,240.00	
“ Admissions	90.00	
“ Sundries	195.95	8,487.26
		<hr/>
		\$12,205.38

Expenditures.

Assistant Librarian Emerita	\$500.00	
Expenses of Library	2,338.10	
Assistant Treasurer	250.00	
Treasurer's Expenses	965.24	
Books and Binding	1,171.09	
General Expenses	871.08	
House Expenses	2,868.50	
President's Expenses	40.00	\$9,004.01
		<hr/>

Interest on Bonds, bought	\$44.25	
Adjustment of dividend on 10 shrs. A. T. & T. Co. rec'd in conversion	10.50	
Income transferred to principal	374.67	429.42
		<hr/>
		\$9,433.43
Balance, April 1, 1924		2,771.95
		<hr/>
		\$12,205.38

RUMFORD FUND.

Receipts.

Income on hand April 1, 1923	\$6,453.72	
From Investments	3,844.73	\$10,298.45
		<hr/>

Expenditures.

Research	\$1,200.00	
Purchase and Binding of Books and Periodicals	214.98	
Publications	1,914.97	
Tables of Constants	200.00	
Account of Restoration of Rumford Monument	56.23	\$3,586.18
		<hr/>
Income transferred to principal		191.49
		<hr/>
		\$3,777.67
Balance, April 1, 1924		6,520.78
		<hr/>
		\$10,298.45

C. M. WARREN FUND.

Receipts.

Income on hand April 1, 1923	\$1,982.20	
From Investments	1,142.08	\$3,124.28
		<hr/>

Expenditures.

Research	\$1,000.00	
Vault Rent — part	3.00	\$1,003.00
		<hr/>
Income transferred to principal		1,056.45
		<hr/>
		\$2,059.45
Balance, April 1, 1924		1,064.83
		<hr/>
		\$3,124.28

PUBLICATION FUND.

Receipts.

Income on hand April 1, 1923		\$6,383.95
From Income Appleton Fund	\$1,261.75	
“ Income Centennial Fund	2,499.03	
“ Authors’ Reprints	381.22	
“ Sale of Publications	606.24	4,748.24
		<hr/>
		\$11,132.19

Expenditures.

Publications	\$6,084.31	
Vault Rent — part	10.00	\$6,094.31
		<hr/>
Adjustment of dividend on 7 shrs. A. T. & T.		
Co. rec’d in conversion	\$7.35	
Income transferred to principal	177.30	184.65
		<hr/>
		\$6,278.96
Balance, April 1, 1924		4,853.23
		<hr/>
		\$11,132.19

FRANCIS AMORY FUND.

Receipts.

From Investments	\$1,720.00
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Expenditures.

Publishing Statements	\$75.15	
Interest on Bonds bought	19.75	\$94.90
		<hr/>
Income transferred to principal		1,625.10
		<hr/>
		\$1,720.00

The following reports were also presented:

REPORT OF THE LIBRARY COMMITTEE.

The Librarian begs to report for the year 1923-24, as follows:

During the year, 70 volumes and 21 unbound numbers of periodicals have been borrowed by 15 Fellows and 5 libraries, the Library of the Massachusetts Institute of Technology alone having borrowed 41 volumes and numbers. Many books have been consulted and used at the Academy. All books taken out have been returned or satisfactorily accounted for.

The number of books on the shelves at the time of the last report was 39,083. During the year, 542 volumes have been added, making the number now on the shelves 39,625. This includes 68 purchased from the General Fund, 21 from the Rumford Fund, and 444 received by gift or exchange. The number of pamphlets added was 75.

The expenses charged to the Library during the financial year ending April 1, 1924, are:

Salaries	\$2,196.00
Binding:	
General Fund	589.65
Rumford Fund	33.40
Purchase of periodicals and books:	
General Fund	583.09
Rumford Fund	181.58
Miscellaneous	142.10

In the death of Dr. Arthur Gordon Webster on May 15, 1923, the Academy lost a Librarian who had devoted himself conscientiously

and effectively to the interests of the Academy Library for a period of eight years. An appreciation of his long and faithful service in this office should be recorded in this report.

Since Mrs. Smith gave up her position in July 1923, the Assistant Librarian has carried on the work without an assistant, except during December, January and February, when a special assistant was employed on part time to get into shape a list of the duplicate books, society publications and periodicals in the Library, in the expectation of disposing of them shortly by sale or exchange.

The cataloguing of the pamphlet collection was contemplated, but the lack of funds has necessitated postponing this work to some future date. The collection is now arranged alphabetically by authors in metal filing cases. By vote of the Academy on April 9, 1924, the medical pamphlets of this collection were offered to the Boston Medical Library, which has accepted the gift with grateful appreciation.

Respectfully submitted,

H. M. GOODWIN, *Librarian.*

May 14, 1924.

REPORT OF THE RUMFORD COMMITTEE.

The Committee organized on October 10, 1923, by electing Theodore Lyman as Chairman and P. W. Bridgman as Secretary.

The following grants in aid of researches in Light and Heat have been made during the year 1923-24:

October 10, 1923. To Professor Harlow Shapley of Harvard University for the purchase of a thermo-electric microphotometer \$500

October 10, 1923. To Professor R. W. Wood of Johns Hopkins University for the purchase of a Lummer Plate for the study of Magneto-Optic Polarization Phenomena 250

February 13, 1924. To Professor R. W. Wood of Johns Hopkins University in continuation of the grant of October 10 200

February 13, 1924. To Professor Norton A. Kent of Boston University for the continuation of his research on the Constitution of Spectral Lines 250

March 12, 1924. To Professor P. W. Bridgman to aid in the continuation of his researches on the Thermo-Dynamic Properties of Matter \$500

The following papers in the Proceedings have been published with aid from the Rumford Committee since the presentation of the last Report of this Committee:

The Effect of Pressure upon Optical Absorption, by Frances G. Wick, Vol. 58, No. 16.

The Effect of Tension on the Thermal and Electrical Conductivity of Metals, by P. W. Bridgman, Vol. 59, No. 6.

The Thermal Conductivity of Liquids under Pressure, by P. W. Bridgman, Vol. 59, No. 7.

The Compressibility of Five Gases to High Pressures, by P. W. Bridgman, Vol. 59, No. 8.

The Committee has authorized the publication of a paper by Professor John R. Roebuck on the Joule-Thomson Effect in Air.

The sum of \$200 has also been appropriated to assist in the publication of a paper by Dr. Harlow Shapley and Miss Cannon on Stellar Distribution.

The Chairman has approved the expenditure of \$112.45 to assist in the restoration of the Tablet to Count Rumford at Auteuil, France. He has also approved the payment of \$200 as the annual subscription towards the Tables of Physical Constants of the National Research Council.

This year no request for reports of progress has been sent out to those working under grants from the Committee.

For many years Professor Arthur Gordon Webster and Dr. Louis Bell served as members of this Committee, Professor Webster acting as Secretary. The members of the committee wish to record their appreciation of the services of these gentlemen and to express their deep regret at their loss.

THEODORE LYMAN, *Chairman.*

May 14, 1924.

REPORT OF THE C. M. WARREN COMMITTEE.

The Committee had at its disposal at the beginning of the fiscal year 1923-24, \$3,190.47. During the year ending March 31, 1924, grants to the amount of \$1,000.00 were made, \$1,000.00 was trans-

ferred to the principal of the Fund and \$136.27 in premiums on bonds was charged to the income. The balance on March 31, 1924, was, accordingly, \$1,054.47. The appropriation of the Academy for the coming year was \$1,070.41. The amount at the disposal of the Committee for the year 1924-25 is \$2,124.61.

Since the last annual report awards have been made as follows:

April 9, 1923. To Prof. David E. Worrall, Tufts College, \$250 to purchase apparatus and chemicals in connection with his work on the chemistry of mustard oils.

April 9, 1923. To Prof. R. R. Renshaw, New York University, \$200 for special apparatus needed in the study of the causes of the physiological activity of choline and its derivatives. He was also loaned the potentiometer returned by Prof. Willard, of the University of Michigan, at the completion of his researches.

November 7, 1923. To Prof. James B. Conant, Harvard University, \$150 to aid in his researches on Oxidation and Reduction.

November 7, 1923. To Prof. Harold Hibbert, Yale University, \$300 to aid in his researches on the Constitution and Properties of Polysaccharides.

December 5, 1923. To Prof. Wilder D. Bancroft, Cornell University, \$100 to assist in his work on Contact Catalysis.

Reports of progress have been received from the following: Profs. Worrall, Renshaw, Kraus and Fay.

During the past year researches carried out with the aid of grants from this Committee have been published by the following:

Dr. R. L. Datta on "The Temperature of Explosion for Endothermic Substances. II. Trinitro-Meta-Cresolates and Their Explosion Temperatures," *Jr. Am. Chem. Soc.*, Oct. 1923.

Prof. Charles A. Kraus on "Reactions of Strongly Electro-Positive Metals with Organic Substances in Liquid Ammonia Solution. I. Preliminary Investigations," *Jr. Am. Chem. Soc.*, March 1923.

Prof. Henry Fay on "The Determination of Nitrogen in Steel," *Chem. and Met. Eng.*, Feb. 1, 1922.

Prof. James B. Conant on "Electrochemical Study of Reversible Reduction of Organic Compounds," *Jr. Am. Chem. Soc.*, June 1922; "Free and Total Energy Changes in the Reduction of Quinones," *Jr. Am. Chem. Soc.*, Nov. 1922; "Addition Reactions of Phosphorus Halides. VI. The 1,2 and 1,4 Addition of Diphenyl-Chlorophos-

phine," *Jr. Am. Chem. Soc.*, Jan. 1923; "An Electrochemical Method of Studying Irreversible Organic Reductions," *Jr. Am. Chem. Soc.*, April 1923; and "Reduction Potentials of Quinones. I. The Effect of the Solvent on the Potentials of Certain Benzoquinones," *Jr. Am. Chem. Soc.*, Sept. 1923.

The Chairman of the Committee has been collecting reprints of papers published in the past by men who have received grants. Up to the present reprints of 32 articles have been received.

JAMES F. NORRIS, *Chairman*.

May 14, 1924.

REPORT OF THE COMMITTEE OF PUBLICATION.

The Committee of Publication reports as follows for the year April 1, 1923, to March 31, 1924:

The Committee and the Academy lost the valuable services of Mr. Derr, representing Class I, and holding the chairmanship of the Committee, through his death about a year ago. This event caused some very slight disturbance in the conduct of the work of your Committee and would have caused much more had it not been for the readiness with which Mr. Howard, representative of Class III, took up the work and carried it on until Decèmber, when Mr. Wilson consented to serve temporarily as representative of Class I, to conduct the routine editorial work for the Committee.

During the past twelve months since the presentation of the last report, there have been printed No. 4, of Vol. 14 of the *Memoirs*; Nos. 9-17 inclusive of Vol. 58 of the *Proceedings*, and Nos. 1-9 of Vol. 59.

The financial report is as follows:

Receipts.

Balance, April 1, 1923	\$6,146.41	
Appropriation for 1923-24	3,368.32	
Sale of Publications	606.24	
Received for authors' reprints	381.22	\$10,502.19

Expenses.

Engraving, printing and binding	\$5,836.09	
Cartage and mailing	242.80	
Committee's expenses	5.42	\$6,084.31
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Balance on hand, March 31, 1924		\$4,417.88

From this report it appears that the balance has been reduced by \$1,728.53 during the year, despite the payments on the part of the Rumford Committee for the publication of articles on light and heat of \$1,914.97. This means that the publications of the Academy have cost during the fiscal year just closed about \$3,850.00 more than the income of the Publication Fund, including income from sale of publications, extra author's reprints, etc. Even with a continuance of contributions by the Rumford Committee toward the expenses of publication of articles in the field of that committee, it is safe to say that there will come a time within the next three or four years when the publications of the Academy must be considerably reduced in volume unless there is some way to reduce the cost per page now paid for printing.

Your Committee would point out that the Proceedings and Memoirs of the American Academy have long been very serviceable as a medium of publication for scientific and other material of the highest grade and that there is at present upon the Proceedings and Memoirs a large pressure of material that should be published. We have, for example, in press seven manuscripts for the Proceedings and two manuscripts for the Memoirs, material sufficient to complete Volume 14 in the Memoirs and Volume 59 of the Proceedings. Your Committee will direct every effort toward the reduction of costs of the publications but believes that it is none too soon for the Academy seriously to consider where it may look for some additional endowment for publication, because it is too much to hope that costs can be reduced to anything like the pre-war figure and it would be unfortunate, both for the Academy and for its members, if any steps shall have to be taken to reduce the space available for publishing material of the caliber that has distinguished these publications for many years.

Respectfully submitted,

E. B. WILSON, *Chairman.*

May 14, 1924.

REPORT OF THE HOUSE COMMITTEE.

The House Committee submits the following report for 1923-1924:

In July, previous to starting for Europe, Professor John O. Sumner resigned his chairmanship of the House Committee, and the duties of that office were assumed for the remainder of the Academy year by the present Chairman.

With the balance of \$5.74 left from last year, an appropriation of \$3,000, and \$215 received from other societies for the use of the rooms, the Committee has had at its disposal the sum of \$3,220.74. The total expenditure has been \$3,083.50, leaving an unexpended balance on April 1, 1924, of \$137.24. The expenditure has been as follows:

Janitor	\$940.00
Electricity { Light	197.60
{ Power	71.82
Coal	909.66
Care of elevator	106.17
Gas	60.40
Water	16.94
Telephone	71.19
Ash tickets	27.75
Upkeep	638.09
Janitor's materials and supplies	43.88

Total expenditure \$3,083.50

The amount of \$215 contributed by other societies for the use of the building leaves the net expense of the House \$2,868.50.

An unusual amount had to be expended this year on the upkeep of the building owing to necessary repairs to the roof, and the renewal of the copper capping on the side wall.

The main staircase well, the outside wall of the book stack, and the fire escape were painted during the summer, and it is planned to have the Lecture Hall painted this summer. Unfortunately, the income of the Academy does not warrant doing all the painting needed to put the building in perfect condition, but as much as possible should be done each year.

Meetings have been held as follows:

The Academy	
Stated meetings	8
Archæological Institute of America	2
Colonial Society	4
Geological Club of Boston	4
Harvard-Technology Chemical Club	9
New England Botanical Club	9
	—
	36

Since July 1923, the Academy has allowed the newly organized Society of Friends of Medical Progress the free use of the Committee Room on the first floor as an office.

The Council Chamber has been used for Academy Council and Committee Meetings, and also by the Colonial Society, the Trustees of the Children's Museum, and the Thursday Evening Club.

Respectfully submitted,

WILLIAM H. LAWRENCE, *Chairman.*

May 14, 1924.

On the recommendation of the Treasurer, it was

Voted, That the Annual Assessment be \$10.00.

The annual election resulted in the choice of the following officers and committees:

THEODORE LYMAN, *President.*

ARTHUR E. KENNELLY, *Vice-President for Class I.*

WILLIAM M. WHEELER, *Vice-President for Class II.*

ARTHUR P. RUGG, *Vice-President for Class III.*

NORTON A. KENT, *Corresponding Secretary.*

CHARLES B. GULICK, *Recording Secretary.*

HAROLD MURDOCK, *Treasurer.*

HARRY M. GOODWIN, *Librarian.*

Councillors for Four Years.

ARTHUR B. LAMB, *of Class I.*
FRANCIS W. PEABODY, *of Class II.*
WILLIAM B. MUNRO, *of Class III.*

Finance Committee.

ARTHUR LORD, THOMAS BARBOUR, PAUL J. SACHS.

Rumford Committee.

THEODORE LYMAN, HARRY M. GOODWIN,
ELIHU THOMSON, CHARLES L. NORTON,
PERCY W. BRIDGMAN, HARLOW SHAPLEY,
ARTHUR E. KENNELLY.

C. M. Warren Committee.

JAMES F. NORRIS, WALTER L. JENNINGS,
HENRY P. TALBOT, ARTHUR D. LITTLE,
GREGORY P. BAXTER, LAWRENCE J. HENDERSON,
FREDERICK G. KEYES.

Publication Committee.

EDWIN B. WILSON, *of Class I.*
HERBERT V. NEAL, *of Class II.*
ALBERT A. HOWARD, *of Class III.*

Library Committee.

EDWIN B. WILSON, *of Class I.*
THOMAS BARBOUR, *of Class II.*
WILLIAM C. LANE, *of Class III.*

House Committee.

WILLIAM H. LAWRENCE,
ROBERT P. BIGELOW, S. BURT WOLBACH.

Committee on Meetings.

THE PRESIDENT.

GEORGE H. PARKER.

THE RECORDING SECRETARY.

GREGORY P. BAXTER,

EDWARD K. RAND.

Auditing Committee.

GEORGE R. AGASSIZ.

JOHN E. THAYER.

The Council reported that the following gentlemen were elected members of the Academy:

Class I, Section 1 (Mathematics and Astronomy):

William Caspar Graustein, of Cambridge, as Fellow.

John Anthony Miller, of Swarthmore, Pa., as Fellow.

Class I, Section 2 (Physics):

Albert Einstein, of Berlin, as Foreign Honorary Member.

Paul Alphonse Heymans, of Brookline, as Fellow.

Class I, Section 3 (Chemistry):

James Bryant Conant, of Cambridge, as Fellow.

Class I, Section 4 (Technology and Engineering):

Charles Leavitt Edgar, of Brookline, as Fellow.

Class II, Section 3 (Zoölogy and Physiology):

Edwin Garrigues Boring, of Cambridge, as Fellow.

Edward Allen Boyden, of Newton Centre, as Fellow.

Raymond Dodge, of Middletown, Conn., as Fellow.

Samuel Jackson Holmes, of Berkeley, Cal., as Fellow.

Class II, Section 4 (Medicine and Surgery):

Walter Elmore Fernald, of Waverley, as Fellow.

Edward Wyllys Taylor, of Boston, as Fellow.

Class III, Section 1 (Philosophy and Jurisprudence):

Charles Ambrose DeCourcy, of Boston, as Fellow.

Class III, Section 2 (Philology and Archæology):

Ingersoll Bowditch, of Boston, as Fellow.

Class III, Section 3 (Political Economy and History):

Claude Halstead Van Tyne, of Ann Arbor, Mich., as Fellow.

The following communications were presented:

Mr. Samuel J. Barnett: "New Researches on the Magnetization of Ferromagnetic Substances by Rotation and the Nature of the Elementary Magnet" (in collaboration with Mrs. L. J. H. Barnett), with lantern illustrations.

Mr. George L. Kittredge: "The Ballad of Lovewell's Fight."

The following papers were presented by title:

"The Bodily Proportions of Women in the United States; Based upon Measurements Taken from One Hundred Smith College Students," by Harris Hawthorne Wilder and Margaret Washington Pfeiffer.

"Granites and Pegmatites of Cape Ann, Massachusetts," by Charles H. Warren and Hugh E. McKinstry.

On motion of Professor Kennelly, the Academy signified its deep appreciation of the services of the retiring President by a rising vote.

At 10.05 the Meeting was dissolved.

BIOGRAPHICAL NOTICES.

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SAMUEL LEONARD ABBOT (1818-1904).

Fellow in Class II, Section 4, 1850.

Samuel Leonard Abbot, Harvard A.B. 1838, M.D. 1841, died July 1, 1904, at the age of eighty-six years.

He was the last of that noteworthy group of practitioners connected with the Massachusetts General Hospital in the fore part of the nineteenth century, the first physician to out-patients, and upon the visiting staff until disqualified by age. These duties of his public professional life he performed with uniform and conscientious devotion.

He was a zealous student of ornithology, long officially connected with the Boston Society of Natural History. For many years he was associate editor of the *Boston Medical and Surgical Journal*, and at his death was the oldest living member of the Thursday Evening Club, He was long one of the administrators of the First Church of Boston.

A notice of his decease will be found in the *Boston Medical and Surgical Journal*, vol. 151, p. 55, 1904, but he had so outlived his contemporaries that at the time of his death the Academy failed to prepare a memoir.

A. C. LANE.

EDWARD EMERSON BARNARD (1857-1923).

Fellow in Class I, Section 1, 1892.

Edward Emerson Barnard was born at Nashville, Tennessee, on December 16, 1857. His father had died shortly before his birth, and his mother was in straightened circumstances, so that his early education was very meager. At the age of nine he began to support himself by acting as apprentice in a photographic establishment at Nashville, which service laid the foundation for his remarkably successful pioneer work in later years as a photographer of the heavens.

His studies in astronomy began by the chance acquisition of a lens which could serve as the foundation of a telescope for observing the moon or the stars. When he was nineteen he bought, from his meager savings, a five-inch telescope.

In May 1881, he discovered an unknown comet, but was unable to

find it after the second day, so that it did not become an object of definite record. Later in the year he began a systematic search for comets, and was very successful in this. At Nashville he discovered ten comets.

He had a remarkably keen eye and an extraordinary memory for the objects in the sky which he found on his sweeps for comets. His earliest work showed accuracy in observation as well as in description. By studying on cloudy evenings, assisted occasionally by a tutor, he was able to fit himself to enter Vanderbilt University as a special student in 1883. He was assistant in astronomy for much of his course, which he completed in 1887.

When the Lick Observatory was organized in 1888, he was called to its staff by Director Holden, and was assigned work with the twelve-inch telescope and the comet-seeker. He discovered seven comets while at the Lick Observatory.

In 1889 he began his important work of photographing the Milky Way, using a portrait lens of the doublet type which had been employed for many years in photographers' studios. His photographs were a surprise and a delight to the scientific world.

On the first of July 1892, he was assigned one night a week with the thirty-six-inch refractor, and on September 9 he made his remarkable discovery of the fifth satellite of Jupiter, an object difficult of observation, not because of its faintness, but because of its closeness to the brilliant planet. With the large refractor, Barnard continued to observe with extraordinary skill and devotion, making a redetermination of the diameters of planets and satellites of the solar system an important part of his program.

In 1895 he was appointed professor of practical astronomy in the University of Chicago and astronomer at the Yerkes Observatory. There was delay in the completion of the Observatory, so that he did not resume micrometric work until the forty-inch telescope was ready for use, in the autumn of 1897.

Meanwhile, he was endeavoring to secure the finest possible photographic objective for further studies of the Milky Way and comets. At his solicitation, Miss Catharine W. Bruce of New York gave \$7,000 to the University of Chicago for such a telescope and its mounting. Different opticians were urged to produce lenses for this special purpose, to be tested as to their suitability by Barnard, who made a

trip to Europe on this account. After some years, a ten-inch lens of thirty-one inches focus, made by Brashear, was purchased as the best available, and the mounting was provided by Warner and Swasey. This instrument, known as the Bruce telescope, was completed early in 1904, and for the next eighteen years was assiduously used by Professor Barnard whenever the sky permitted, and whenever he had no assignment with the forty-inch telescope. His *Atlas of the Milky Way*, which will reproduce fifty areas of the galaxy in the form of photographic prints, will soon be published by the Carnegie Institution of Washington. The photographic prints have been ready for some years, and the descriptive matter was nearly completed at the time of Professor Barnard's death.

As an observer, Barnard has been well likened to William Herschel: nothing in the sky escaped his interest, and no weariness of the flesh or rigor of a Wisconsin winter could induce him to shorten his hours of painstaking labor at the forty-inch refractor or the Bruce telescope. He observed with the micrometer all the current objects which were suitable for a large refractor, including planets, satellites, faint comets, and nebulae, and he made a specialty of the triangulation of the principal stars in the globular clusters. He also took numerous photographs of these interesting objects with the forty-inch telescope, for measurement in the laboratory. It was his expectation that observations continued over a considerable period of years would reveal motions among the members of these systems, but, as a matter of fact, practically none were found. These long series of measures are still unpublished.

Barnard was elected member of the American Academy in 1892. His published papers were very numerous, including some nine hundred items. Volume XI of the *Publications of the Lick Observatory* was devoted to reproductions of his photographs of the Milky Way and comets. His principal papers appeared in the *Astrophysical Journal*, the *Astronomical Journal*, *Astronomische Nachrichten*, *Monthly Notices of the Royal Astronomical Society*, and *Popular Astronomy*.

Mr. Barnard was married in 1881 to Miss Rhoda Calvert. Their home was always a center of hospitality to a large circle of astronomical friends. They never had children. Mrs. Barnard died in 1921.

For the last nine years of his life, Professor Barnard suffered from diabetes, but after overcoming an acute attack he was able to con-

tinue his work without much limitation, until his final illness, which began about Christmas 1922. He died on February 6, 1923.

EDWIN B. FROST.

LOUIS BELL (1864-1923).

Fellow in Class I, Section 2, 1905.

The late Dr. Louis Bell was so well known to many members of the Academy that a brief account of his personality, career and accomplishments is sure to be welcome.

The family name was originally Le Bel, and is traceable back to the Norman conquest of England. The family settled in Scotland not far from the English border. Dr. Joseph Bell, a professor of surgery in Edinburgh University, was one of the line in more recent years. Members of the family emigrating to America in the seventeenth and eighteenth centuries have furnished U. S. senators, congressional representatives, a Speaker of the House, a U. S. Chief Justice, a Secretary of War, a presidential candidate and a Governor of Texas. Their main stronghold was in New Hampshire, a state to which the family supplied three governors, one of whom, Samuel Dana Bell, was said to have "carried New Hampshire in his vest pocket" for a number of years, and who represented that state, for two terms, in the U. S. Senate at Washington, D. C.

Louis Bell was the grandson of this same Governor Samuel Bell of New Hampshire. His father was General Louis Bell, who fought in Grant's army during the Civil War. General Bell, when 28 years old, commanded the attack on Fort Fisher, and was killed in action during the last few minutes of the final successful rush on the trenches, just before the close of the war. The news of his death came as a terrible shock to his young wife, in the family home at Chester, N. H., and she survived him only six months, leaving little Louis, then one year old (born Dec. 5, 1864), and his sister four years older. The two children were brought up at Chester by their grandmother, Governor Samuel Bell's widow. In remote village life, these two children were thrown much on their own resources, and mingled but little with the outer world. Louis was gifted mentally, and was given his bent in study, with full encouragement by his fond grandparent. The boy

was an omnivorous reader, even at the age of eight, and was consumed with a thirst for knowledge of all kinds, but particularly for scientific knowledge. I used to wonder, in later years, how Dr. Bell became so well versed in the Bible and Bible history, until I learned that he was frequently allowed to choose, on Sunday mornings, between going down the hill to church and staying home to learn a chapter of Scripture by heart. Little Louis, with his swift memory, always chose the latter alternative.

When Louis was twelve years old, it was decided that he should be taken from his native village and sent to school at the Phillips Exeter Academy, Exeter, N. H. Thereafter, he only returned to Chester for brief and occasional visits; but he was very deeply attached to his childhood's home and he always desired to be carried back there after his death. He was rather a lonely lad at school, brilliant but living apart. His letters to his sister show how close was their attachment, and how much he depended on her guidance. When she died untimely at twenty-one, he was distracted with grief. He would never trust himself to speak of her in after-life, even to his most intimate friends.

Louis entered Dartmouth, the college of his family, in 1880, and took his A. B. degree there in 1884. In his studies, he distinguished himself in chemistry and physics, and took a year of post-graduate college work in physics. The professor of astronomy there allowed Louis to live at the College observatory, and to use the telescopes for observations, during two summers. Bell always loved telescopes and admired those who knew how to use them.

Bell was always a most loyal and devoted alumnus of Dartmouth, giving, throughout his life, unstintedly of his time and efforts to her aims. From Dartmouth he went to Johns Hopkins University, where he studied under Rowland, and where he took his Ph.D. degree in 1888.

The subject of his thesis was "The Absolute Wave Length of Light." At the Manchester British Association Meeting in September 1888, Dr. Bell presented a joint paper by Prof. Henry A. Rowland and himself on "Explanation of the Action of a Magnet on Chemical Action."

After graduating at Johns Hopkins, Dr. Bell went to join, for a year, the faculty of Purdue University, as professor of applied electricity, or what is now generally known as electrical engineering. This was a new chair at that time in Purdue. He organized the electrical engi-

neering instruction there on a sound basis and in 1890 he went to New York as editor of the *Electrical World*, which has since continued to be a prominent electrical engineering weekly journal. At that time it was owned by W. J. Johnston. It was during this period that I first became acquainted with Dr. Bell as the editor of the *Electrical World*. Ever after that interview, I was his admirer and friend. Bell was always a very clear and forceful writer. It was fortunate for the *Electrical World* that its editor, in Dr. Bell, was not only a prominent electrical engineer but also a good scholar in English. He left the chief editorship in 1892 to enter the service of the General Electric Co., but he maintained literary connection with the *Electrical World*, editorially and otherwise, up to his death. Anyone acquainted with the personal characteristics of his literary style, could readily discern articles by him. He had the gift of writing in such a manner as to compel attention and understanding. There was frequently a background of quaint humor in his articles that tempted the reader to follow, even when the subject was dry and difficult.

It was about 1892 that the alternating-current motor began to enter commercial development. Dr. Bell, as chief engineer of the then newly organized power-transmission department of the General Electric Co., designed and installed some of the first polyphase power-transmission plants in the country.

In 1892, Dr. Bell published (with Oscar T. Crosby) *The Electric Railway*, which was a pioneer book on the subject. In 1896, he himself wrote *Power Transmission for Electric Railroads*, and in 1897, *Electric Power Transmission*, both of which books were soon widely known.

In 1895, he entered the profession of consulting engineering in Boston. He continued in this work for the rest of his life. At first, his work dealt mainly with electric power transmission, but afterwards he took up electric lighting more particularly, and later on he specialized in electric illuminating engineering. He published, in 1902, the textbook *The Art of Illumination*, which became a classic in that field. He lectured frequently on illumination at Harvard University, the Massachusetts Institute of Technology and elsewhere. In 1908, he was the third President of the Illuminating Engineering Society, and was an active member of several of its important committees. He continued to work for the Society up to the last. He was

also, for about ten years, a vice-president of the Illuminating Engineering Society of Great Britain. He was consulting illuminating engineer to the Edison Illuminating Co. of Boston for a number of years, and up to his death. He did much research work with automobile head lights in the early days of automobile long-range search lighting, and contributed materially to the development of automobile head-light lenses.

Although he was always engaged in engineering work, he was keenly interested in pure science, especially in optics and optical astronomy. His book *The Telescope*, published in 1922, is delightful to read, both from the practical and historical, as well as the purely optical view points. He was a member of the American Astronomical Society, and of the Board of Visitors of the Harvard Observatory.

He was elected a member of the American Academy of Arts and Sciences in 1905, was on its Rumford Medal Committee, and contributed various papers to its volumes, particularly on optics. A list is appended of his papers in the Proceedings of the Academy, and in those of the Illuminating Engineering Society, only. No attempt will be made here to give a list of his contributions to technical literature generally, because their name is legion. The fertility of his inventiveness is also shown by the fact that he took out more than forty patents, mainly in the applications of optics and illumination. He gave much time and attention to the preparation of rules for good lighting, serving on a State Commission in Massachusetts in the preparation of a Lighting Code, and also, for some ten years, on a committee of the Illuminating Engineering Society, on Lighting Legislation.

Two weeks after his death, the Council of the Illuminating Engineering Society, in recognition of his many valued services, adopted a fine resolution of esteem and tribute to his memory. This appears in the Society's Transactions for July 1923.

During the Spanish American War, Dr. Bell was Technical Officer of the Volunteer Electrical Corps, dealing with electrical harbor and Atlantic coast defenses from the Chesapeake Bay to the Canadian Border.

In the Great War, he was a member of the Advisory Committee on the Council of National Defense. He was specially occupied with telescopic sights for naval guns. He also developed a very practicable system of invisible signalling by ultra-violet light.

Shortly before his death he was busied, under the stimulus of the investigator's instinct, in making researches on the spectrum of the powerful Sperry arc-lamp projector.

Dr. Bell married Sarah G. Hemenway of Somerville, Mass. in 1893, who with his son Louis and two grandchildren survives him. Bell was a home-making and home-loving man, shining most brightly when acting as host. He was a witty and gracious conversationalist, loving, for its own sake, a humor which never degenerated into satire or sarcasm.

In his leisure hours, which were rather few and far between, Bell enjoyed rifle and revolver shooting. He was always a good marksman, and indeed maintained, in that way, a family tradition of several generations. The Bells were always good shots. He was a member, and had been the President, of the Massachusetts Rifle Association. He also held at one time (New York, 1892) the American amateur revolver-shooting championship. In 1903, he was one of a team of the American Revolver Association which won an international shooting match with a similar French team. He would often spend his Saturday afternoons on the rifle range at Walnut Hill, Mass., where he was very popular and had many friends. He looked upon the rifle rather as an instrument of scientific precision in target hitting, than as a deadly weapon. He was, on the other hand, however, an eager student of military history.

Some two years ago, his usually robust health broke down with an attack of pneumonia and after that it failed rapidly; but his courage was invincible. At the last, he had great hopes, although in reality quite illusory hopes, of recovery. He passed away, happily, during sleep, on June 14, 1923. His final resting place is among the tombs of his kindred, at the quiet village cemetery of Chester, in the farming country of New Hampshire, where many of the existing old homesteads were celebrated in colonial times.

Five days after his death, the posthumous honorary degree of Doctor of Science was awarded to him by his Alma Mater, Dartmouth College. Dr. E. M. Hopkins, the President, delivered on that occasion the following allocution, which Dr. Bell's numerous friends will heartily endorse:

"Louis Bell, teacher, writer, investigator; pioneer in the development of electrical transmission; authority in the fields of illumination

and optics; fruitful in the work of making the accumulations of the laboratory of service to mankind; whose scientific achievements have been combined with wide interest in literature and art, and who, as a writer and lecturer, has brought literary finish and quiet humor to the exposition of sound common sense; loyal alumnus of the college, and ever interested in her welfare."

Publications by Dr. Louis Bell in the Proceedings of the American Academy of Arts and Sciences.

"The Physiological Basis of Illumination." Vol. 43, No. 4, 1907.

"Note on some Meteorological Uses of the Polariscopes." Vol. 43, No. 15, 1907.

"On the Opacity of Certain Glasses for the Ultra-violet." Vol. 46, No. 24, 1910.

"On the Ultra-violet Component of Artificial Light." Vol. 48, No. 1, 1912.

"Types of Abnormal Color Vision." Vol. 50, No. 1, 1914.

"The Pathological Effects of Radiant Energy upon the Eye" (with F. H. Verhoeff and C. B. Walker). Vol. 51, No. 13, 1915.

"Ghosts and Oculars." Vol. 56, No. 2, 1920.

"Notes on the Early Evolution of the Reflector." Vol. 57, No. 4, 1921.

Publications by Dr. Louis Bell in the Transactions of the Illuminating Engineering Society.

"The Illumination of the Building of the Edison Electric Illuminating Company of Boston" (with L. B. Marks and W. D'A. Ryan). Vol. II, No. 7, 1907.

"Coefficients of Diffuse Reflections." Vol. II, No. 7, 1907.

"Response to the Address of Welcome to Convention." Vol. IV, No. 7, 1909.

"The Principles of Shades and Reflectors." Vol. IV, No. 8, 1909.

"Street Photometry." Vol. V, No. 5, 1910.

"Photometry at Low Intensities." Vol. VI, No. 7, 1911.

"Report of Committee on Progress" as Chairman of Committee. Vol. VI, No. 7, 1911.

"The Pathological Effects of Radiation on the Eye" (with F. H. Verhoeff). Vol. XVI, No. 9, 1921.

"Report of Sub-Committee on Glare" as Chairman. Vol. XVII, No. 10, 1922.

A. E. KENNELLY.

WILLIAM BREWSTER (1851-1919).

Fellow in Class II, Section 3, 1891.

William Brewster, a Fellow in the American Academy of Arts and Sciences, was born at Wakefield, Massachusetts, July 5, 1851, and died in Cambridge, Massachusetts, July 11, 1919. His father was John Brewster, a well-known Boston banker. His mother was Rebecca Parker (Noyes). William was the youngest of four children, his brothers and sisters all dying in early childhood. Educated in the public schools of Cambridge, he was forced by defective eyesight to abandon plans for a college course. While a young lad he learned to stuff birds and during his lifetime acquired one of the largest private collections of birds in the country, a collection which he donated to the Agassiz Museum of Harvard University. A year's experience in his father's bank satisfied him that he was not suited to a business career. As a result he devoted his life to scientific work, especially in the field of ornithology. Brewster married Caroline F. Kettell of Boston on February 9, 1878. His publications include over three hundred titles, including his *Birds of Lower California* and *Birds of the Cambridge Basin*. Property acquired by him in Cambridge and Concord was made a sanctuary for birds. For many years of his life he was Curator of Birds and Mammals in the Agassiz Museum. He was one of the founders of the American Ornithologists Union and of the Nuttall Club, of both of which he became President, as well as of the Massachusetts Audubon Society. Amherst gave him the honorary degree of Master of Arts in 1880, and he was given the same degree by Harvard in 1889.

William Brewster was an untiring and accurate observer of bird life, absolutely truthful, judicial in temperament. Physically a handsome man, he had a genius for friendship. He has left a permanent impress upon the science of ornithology.

HERBERT V. NEAL

GEORGE LINCOLN GOODALE (1839-1923).

Fellow in Class II, Section 2, 1874.

George Lincoln Goodale, Fisher Professor Emeritus of Natural History and Honorary Curator of the Botanical Museum of Harvard University, died in Cambridge on April 12, 1923, in the eighty-fourth year of his age. He was born in Saco, Maine, on August 3, 1839, the son of Stephen Lincoln Goodale and Prudence Aiken (Nourse) Goodale.

From Amherst College he received the A.B. degree in 1860 and six years later the honorary degree of Master of Arts. From 1863 to 1866 he practised medicine in Portland, Maine, having received, in 1863, the M.D. degree from Harvard.

At the age of thirty-three he began his active connection with Harvard University, having come there from Bowdoin College, where he had held a professorship in the natural sciences from 1868 to 1872. At Harvard he began his term of service as lecturer on vegetable physiology and instructor in botany. In 1873 he was appointed assistant professor and five years later was made full professor.

From October 6, 1879 to July 31, 1909 he was Director of the Botanic Garden of Harvard University, a position which brought him in close contact with influential men of Boston and afforded an opportunity for the development of his administrative powers. The Botanic Garden in the early days of Goodale's directorship was the botanical center of the University. Until the classes became too large for the lecture room, which had a capacity of about eighty students, it was at the Botanic Garden that laboratory work was done and instruction in botany was given. It was at the Garden, also, that the collections of botanical specimens, which were later transferred to the University Museum, were assembled, treasured and exhibited. Shortly after his appointment to the directorship of the Garden, Goodale found that the growth and progress of his department depended on substantial additions to the sources of income. He immediately set about the task of enlisting the sympathies of men who were interested in horticulture and who would help him with advice or money. Soon delapidated structures were giving place to new buildings and the invested funds of the Garden were being increased by

gifts. So that in addition to the eminent services rendered as an inspiring teacher through thirty-seven years, Goodale was stimulating that development of botany which will always make his term of office memorable in the annals of Harvard University.

During these years, Goodale built up a strong department in the botanical sciences. Early in his career he foresaw the necessity for a well-equipped botanical museum which would arouse the interest of the public and serve as a valuable aid in the courses offered to students. With untiring energy he labored toward the fulfillment of an ideal. His reports to the President of the University emphasized again and again the need of additional space for the rapidly growing classes and for the collections of specimens that were crowding the limited accommodations at the Garden. With the museum in his mind and before its erection was assured, he visited Leopold and Rudolph Blaschka at their home in Dresden for the purpose of inducing them to make models in glass of plants and parts of flowers. Only after repeated refusals did the Blaschkas consent to construct the desired models and enter into the contract which resulted in the now famous collection of glass flowers that is one of the most popular and instructive attractions of the museums maintained by Harvard University.

In 1890-91 he went round the world, visiting the leading botanical establishments of Ceylon, Java, Straits Settlements, Australia and Japan, forming valuable contracts with scientific men and enriching his store of scientific knowledge. The influence of this trip to the tropics was far-reaching. As a result of his observations of the vast importance of botany in the commercial enterprises of the tropics, he determined to make the exhibitions of the new museum reveal the part that plants have played in the service of man.

Of the two great interests of Goodale's life, the museum which he built and a proposed work on economic botany for which he had assembled many critical specimens, the second was interrupted by administrative duties and by failing health. His interest in economic botany was very deep. He was convinced that this branch of his subject was one of the most important for modern times. In his report to the president of the University, for the years 1889-90, he set forth his plan as follows: "It seems no longer wise to withhold a declaration of the policy which I advocate in regard to the Museum of

Economic Botany. It is my wish to make the collection an authoritative cabinet of type specimens to be described in an illustrated series of studies." To those of us who knew the scope of the project and who recognized Goodale's exceptional capacity for its fulfillment, it must ever be a source of disappointment that he did not live to carry it through and fill a gap in botanical literature that still exists.

Although Goodale was the author of many papers on plant physiology and economic botany, and brought out in 1882 his *Wild Flowers of America* for which Isaac Sprague prepared the colored plates, it is his *Physiological Botany*, published in 1885, which stands as his most significant contribution to his subject. This work was prepared for the series of university textbooks which Asa Gray had planned as a complete course of botanical study. Goodale's textbook of *Physiological Botany* was a painstaking production which abounds in helpful citations and is characterized by straightforward exposition. This textbook was the result of profound knowledge and crystallized, as it were, the experiences he had gained in opening up for American students the subject of plant physiology as understood at the time by leaders in botanical thought. L. H. Bailey, in a biographical sketch of Goodale published in the twenty-fifth volume of *Rhodora*, writes of this work as follows: "It is a solid substantial book that students of the present day would do well to understand." It was only in the last two decades of the nineteenth century that physiological botany began to take its place in the development of science in America. Goodale was among the leaders in this field and his textbook stands as a creditable monument to the part he took in the introduction of physiological botany to American colleges. He hoped to issue a second edition of this textbook. With this aim in view he accumulated a vast amount of material, but he became so much occupied with other work that a second edition never appeared.

His desire to increase the influence of Harvard University in the realm of science led to the establishment of a tropical garden and experiment station in Cuba, near the city of Cienfuegos. He succeeded in interesting Mr. E. F. Atkins of Boston in this enterprise, which is now one of the important branches of Harvard's establishments for research in applied biology and a repository of an extensive collection of economic plants. In this garden originated the first seedlings of the sugar cane to be raised in Cuba. Toward the end of

his life he had the satisfaction of knowing that a liberal endowment had been secured to perpetuate the work he had started.

It was my good fortune to accompany Goodale to Cuba when in 1899 he made his first visit to the proposed site of the new garden. It was on this trip that I began to know the sterling character of the man and to form that deep affection for him which increased with the passing of time. As I think back through the years in which it was my privilege, both as student and colleague, to know Goodale, the outstanding characteristics of his personality were delightful courtesy toward all who had dealings with him; consummate tact in handling the delicate situations which confronted him as head of a university department, and punctilious integrity in his business transactions with the many good friends who helped him to bear the burdens of building up the Botanic Garden and the Botanical Museum.

It was as a charming and finished lecturer, I think, that Goodale stands out most prominently in the memory of those who attended his courses in Harvard College. As a teacher he was forceful and concise. His demonstrations were fascinating and skillful. Combined with unique gifts of clear thinking and careful exposition were a commanding presence and a convincing manner. If, putting aside Goodale's achievements which stand as concrete evidence of his capacity, we judge him simply through his influential contacts with students during a long life as an inspiring teacher, we must arrive at the conclusion that his position among scientific men is a commanding one and that he made an indelible impression on the history of botany and botanical thought in America.

From 1888 to 1909 Goodale was Fisher Professor of Natural History. In 1909, when he retired from active teaching, he was made Fisher Professor Emeritus and Honorary Curator of the Botanical Museum. After his retirement he lived quietly at his home at 5 Berkeley Street, Cambridge. Here he converted a room into a laboratory and carried on his researches in museum technique. His visits to the Museum grew less and less frequent as his bodily strength waned, but to the end the Museum was uppermost in his daily thoughts and what might be its future was the only disturbing question in his mind.

Beyond the University his work was well known. In 1889 he was vice-president of the Biological Section of the Association for the

Advancement of Science. In 1890-91 he was president of the Association. In 1890 he received the LL.D. degree from Amherst College. In 1894 Bowdoin and in 1896 Princeton University honored him with similar degrees. He was an honorary fellow of the New York Academy of Sciences and of the Royal Society of New Zealand, and member of the Philosophical Society and National Academy of Sciences. He held membership in many botanical societies and was in attendance at the International Botanical Congress held in Brussels in 1910.

In 1866 he married Henrietta Juel Hobson who survives him, as do his two sons, Dr. Joseph Lincoln Goodale of Boston and Francis G. Goodale of Weston, Mass.

OAKES AMES.

SILAS WEIR MITCHELL (1829-1914).

Fellow in Class II, Section 3, 1865.

PERSONAL RECOLLECTIONS BY W. W. KEEN, M. D.

There is one serious difficulty in my writing my personal recollections of Dr. Weir Mitchell, namely, the impossibility of compressing within a reasonable compass his many and varied activities covering sixty years, and also my own friendship with him during almost as long a period.

He was one of what, some years ago, I described as "The Philadelphia Triumvirate"—Henry Charles Lea, Horace Howard Furness and Silas Weir Mitchell. No other three citizens shed such luster upon their native city during many years past.

Weir Mitchell was born on February 15, 1829; graduated from the Jefferson Medical College, when twenty-one years of age, in 1850; read his first paper at the age of twenty-three, and wrote his last novel at the age of eighty-three. He sank to rest after a brief illness, in undimmed splendor, on January 4, 1914, when almost eighty-five years of age.

He was just eight years my senior, but he graduated in medicine early and I graduated late. He had so much the start of me that I always held him rather in reverence as a father than as an elder brother.

As Dr. Charles W. Burr noted, "As a boy he had that best education, hearing his elders converse on things worth talking about"—not a bad hint for young parents to-day.

In the sixty years of his active scientific and literary life, he published over two hundred and fifty books, papers, reports, etc. He personally taught a generation of eager pupils. He prepared himself for the Chair of Physiology but, sad to say, he was twice defeated for such a Chair, both in the Jefferson Medical College, his Alma Mater, and also at the University of Pennsylvania. How utterly blind these two Boards of Trustees were to an extraordinary genius!

His election to the Board of Trustees of the University of Pennsylvania, a number of years later, marked the final victory of the younger progressives of the Medical Department in that university, led by Harrison Allen, William Pepper, James Tyson, H. C. Wood, and others. The most suggestive, and at the same time witty congratulation on his election was uttered by Harrison Allen—"Thou shalt not be King but thou shalt beget Kings."

My personal acquaintance with Dr. Mitchell began three days after I had started on my medical studies, in September 1860, when he asked me to help him in some experiments on snakes. He was already a distinguished physiologist, known in Europe as well as at home. Then began the most intimate medical friendship of my life, closed only by his death over fifty-three years later, with never a cloud so large as a man's hand between us.

The best term by which to describe him was that which I often applied to him, "a yeasty man." His own mind was always fermenting with new ideas, new researches, new papers, new poems, new novels. He gave points to the neurologists, the orthopedists, the gynecologists, the ophthalmologists, the anatomists, the surgeons, the botanists.

The last evening I spent with him, only a few days before his final illness, when he was almost eighty-five years old, his yeasty mind was still fermenting. His mind, in its ninth decade, was still hospitable to new ideas. "Why do not the botanists," he suddenly exclaimed to me, "try experiments such as the following." Then he proceeded to develop a scheme for certain experiments on plants, not knowing that, at that very time, half-way round the globe, Sir J. C. Bose, a wonderfully talented Hindu—who was knighted by the king for his scien-

tific work and received a higher accolade from the Royal Society, being made an F. R. S.— was actually carrying out *in extenso* the idea that Mitchell briefly suggested to me in that very conversation.

He was the first to describe erythromelalgia; investigated with William Thomson eye strain as the cause of persistent headache; and with Thomson and myself the final distribution of all the optic nerves in the retina beyond the chiasm; discovered the chiasm of the respiratory nerves in the turtle; studied the diseases of stumps, including the curiously persisting phantom limbs after amputation; discovered, with Morris J. Lewis, more than one muscular reflex; devised the Mitchell "rest cure;" studied with Morehouse and myself the dreadful, persistent pain after wounds of nerve trunks (causalgia), and introduced the use of atropin with morphin, for its relief, an investigation which produced the little tablets which we now have for use in various proportions of these remedies by means of the hypodermic needle.

He was a large factor in introducing the wide use of the thermometer, the electric battery and the hypodermic syringe during the Civil War. I do not think that, outside of our hospital at Turner's Lane, there were, in the whole Army of the Potomac, a half dozen of these three devices for diagnosis and treatment.

His remarkable presidential address at the second meeting of the Triennial Congress of American Physicians and Surgeons in 1891, on the "Early History of Instruments of Precision," is still a classic and a storehouse of knowledge for the profession.

His thorough historical studies of the dress, manners and peculiarities of conversation of the eighteenth century, in order to write his "Youth of Washington," for a reproduction of the very atmosphere of the times in which Washington lived, may well serve as a model to other historians. His studies of the relation of weather to neuralgia, covering some years of coöperation by a most intelligent army officer of the line, is also a model for other similar investigations.

Sir James Paget, when President of the great International Congress of Medicine in London in 1881, was well within the mark, when as I sat opposite him at table as his guest during the Congress he said to me, "Dr. Mitchell is one of the most distinguished medical men in your country," adding, after a brief pause, "or in any country."

The venoms of various snakes — the rattle snake, the moccasin, the

cobra — and of the related South American poisons, corroval and vao, also interested him for over half a century. His own researches, in which I assisted him for several years, were of great importance for he first discovered that these venoms were toxic albumins. He also stimulated and, in various ways, aided Noguchi and later Reichert in the investigations of the effects of these venoms upon the blood and especially on the crystallography of the blood, the subject of his very first paper in 1852. He was also one of the original and most active trustees of the Carnegie Institution, which gave him opportunities to aid and stimulate others in their researches.

The Civil War, which broke out on April 15th, 1861, gave him an unrivalled opportunity to study injuries and diseases of the nervous system, upon which his alert mind quickly seized. Among the special hospitals which his friend, Surgeon General Hammond established at Mitchell's instance, was one devoted entirely to these neurological diseases and injuries, first located in the Christian Street Hospital and later chiefly at the Turner's Lane Hospital, both in Philadelphia. He and Dr. George R. Morehouse were appointed Acting Assisting Surgeons of the U. S. Army, in charge of these wards. It was the most fortunate event of all my professional life that Mitchell asked Hammond to transfer me to the Turner's Lane Hospital as their junior in the service. I was ordered there early in 1863 about a year after my graduation. The reason he asked for my transfer, he told me years afterwards, was, that he had early found "that he could not kill me with hard work"—a cherished encomium.

I have never wearied in telling the story of his broad-minded generosity. He was the guiding spirit of our "firm," if I may use such a term, at a time when it was extremely unusual for papers, books, etc., to be written by more than a single author. Soon after I joined them, Mitchell plotted our work. He assigned to himself a paper on "Reflex Paralysis" (Circular No. 6 Surgeon General's Office, U. S. Army, 1864), a book on "Gun Shot Wounds and Other Injuries of Nerves" (J. B. Lippincott Co., 1864), with several other papers. Morehouse was to write on certain other subjects, such as "Epilepsy," "Choreal Affections," etc., and I was to do the experimental work on the "Antagonism between Morphin and Atropin," under their direction, on which later Mitchell's text was founded. I, myself, was also to write a detailed paper of nearly thirty pages, published in the American

Journal of the Medical Sciences, for October 1864, on "Malingering." We were the first, I believe, to introduce ether anesthesia as a means for detecting these shirkers. Not a few amusing stories arising in the course of these investigations are recorded in that paper.

How well I recall the hours and hours, not seldom long after midnight, when I wrote literally thousands and thousands of pages of histories (for dictation and the typewriter were still below the horizon). Many of these were the foundation of the paper on "Reflex Paralysis," and the book on "Gun Shot Wounds and Other Injuries of Nerves," on "Malingering" and other later papers. Most of the material for Dr. Morehouse's papers was destroyed by a fire in his office and "carbon copies," alas, were utterly undreamed of.

I am not sure but that this fire was a great relief to Dr. Morehouse. He was a most accomplished and delightful talker, with a head full of ideas. His knowledge was extensive. He could converse by the hour most entertainingly and set forth his ideas logically and philosophically. But put a pen in his hand, and it became for the nonce paralyzed. He wrote very few papers. Medicine lost much of value by his silence.

Note, now, the large-minded, big-hearted generosity of Dr. Mitchell. Ninety-nine men out of a hundred would have published their books and papers, "By S. Weir Mitchell, M.D. and George R. Morehouse, M.D." as authors, and in the preface would have expressed their "obligation to Acting Assistant Surgeon, Dr. W. W. Keen, for his faithful and intelligent work in recording the histories and carrying out the experiments as planned by the authors," or some similar phraseology. Not so Mitchell. The paper on "Reflex Paralysis" and the book on "Gun Shot Wounds and Other Injuries of Nerves" were by "S. Weir Mitchell, M.D., George R. Morehouse, M.D., and W. W. Keen, M.D.," and the long paper on "Malingering" was "By W. W. Keen, M.D., S. Weir Mitchell, M.D., and George R. Morehouse, M.D." I, a mere medical kid, barely two years out of the medical school, had my name precede that of Mitchell, already recognized in Europe as well as in America as a master mind in research, as well as that of Morehouse. This, too, is a suggestion for imitation today, for recognition limited to a preface, and sometimes not even appearing there, is not altogether unknown.

But even better than this remarkably generous treatment was the profound influence that Mitchell exerted upon my whole professional

life. He gave me the scientific bent, the ardor in the search for scientific truth, the eager and constant desire for "Work," that "Master Word" in medicine, as Osler has well called it. He taught me how to observe and how to elicit, often literally to "dig up," histories from unobservant patients. As the eye of an expert geologist almost instantly sees the meaning of a barely visible outcropping of a vein of precious ore, Mitchell taught me to recognize and to seize at once upon some small and apparently insignificant fact which, when fully investigated, proved to be of great value in practice, or even the key to the secret of the patient's chief malady.

Even in the sixties, Mitchell showed a certain tremor of his hands, yet, in spite of this unsteadiness, I never saw him injure or divide a nerve or a blood vessel or a tissue which he desired not to cut.

His recreations were largely in the woods and in fishing. He is well remembered on Mt. Desert by his laying out the Cadillac trail. For many years he camped out with Phillips Brooks, Bishop McVickar and the Rev. Dr. Charles D. Cooper. On Sunday they always held a service and Mitchell told me with great glee how, on one occasion, Bishop Brooks' tongue got derailed in the middle of the Lord's Prayer and he had to begin over again. This accident is not limited to bishops.

I have no time to consider his extensive list of novels, essays, poems, etc. His biography, soon to be published, will detail these and many other interesting facts.

He was always and everywhere a *primum mobile*, starting the wheels going and always to accomplish some good piece of work. Osler was the only rival I have ever known in this stimulating influence over others. William Pepper was a near rival. Fortunate, indeed, were the many who have benefited by the influence which Mitchell shed all around him. I count myself the most fortunate of them all.

W. W. KEEN.

JAMES MILLS PEIRCE (1834-1906).

Fellow in Class I, Section 1, 1862.

James Mills Peirce, son of Professor Benjamin Peirce, was born in Cambridge on May 1, 1834. He was graduated at Harvard in 1853 and immediately entered the Harvard Divinity School, and after taking his degree of Bachelor of Divinity he preached for a short time in a church in Somerville.

A ministerial life soon palled on him and he accepted a tutorship at Harvard in 1856. He became Assistant Professor of Mathematics in 1859, University Professor of Mathematics in 1869, and Perkins Professor of Mathematics and Astronomy in 1885.

He was for many years secretary of the Academic Council, and on the formal organization of the Graduate School of Arts and Sciences in 1890 he became its Dean.

He died in harness on the 21st of March 1906, in the seventy-second year of his age, having nearly completed his fiftieth year of service in the Harvard Faculty.

His life was devoted to the liberalizing of Harvard College and the development on the academic side into Harvard University. He was one of the pioneers in introducing and expanding the elective system in the College; and during the long administration of his classmate, President Eliot, he worked shoulder to shoulder with him in fostering graduate study in the University; and when finally the Graduate School of Arts and Sciences was established he served devotedly and untiringly for many years as its Dean.

For nearly fifty years he was a picturesque figure in the College, living the larger portion of that time in the College Yard, peculiarly accessible to the students, many of whom became his intimate friends. Always genial, kindly, and helpful, he was a man who could unbend without seeming to realize that he was unbending.

He was a deep and thorough scholar in his special subject, rather a student than an investigator; an excellent teacher, and an unusually clear and polished lecturer. His intellectual activities were by no means confined to his chosen science; he was an omnivorous reader, rather fonder of the drama than of other departments of literature, a fine Shakespearean scholar, and a remarkable dramatic reader.

The stage and whist were his two great passions, and toward the end of his life they occupied most of his evenings, for he was a bachelor and a clubman.

During his college course James Mills Peirce was a member of the Alpha (Harvard) Chapter of the Psi Upsilon fraternity. Among his fellow-members were W. W. Goodwin, Ephraim W. Gurney, Benjamin J. Jeffries, Alexander Agassiz, Theodore Lyman, and Robert Treat Paine. Although the chapter later became inactive Professor Peirce always retained his interest in the fraternity and attended frequently to the end of his life the graduate banquets which were held in Boston.

W. E. BYERLY.

COUNT SOLMS (1842-1915).

Foreign Honorary Member in Class II, Section 2, 1896.

In estimating a great scholar, inspiring teacher, or productive scientist, statistical matter takes secondary rank. The bulk of his published output, size of his classes, length of his service, extent of his organizing and administrative activities — all these quantitative matters, which seem to have made the sum of his achievement, are much less significant, certainly far less interesting, than those human traits which made him what he was. His energy, sincerity, breadth of mind, his clarity of diction, skill of hand, quickness of apprehension, fairness in controversy, kindly interest, even his sense of humor — just these things which cannot be measured are what make a man a vital force in his epoch. It is through them that he catches the attention of his contemporaries, influences his colleagues, guides and stimulates his students, and thus leaves his impress upon a branch of knowledge.

Hermann, Count of Solms-Laubach, was born December 23, 1842, near the small village of Laubach in Upper Hesse, and died at Strasburg in Alsace November 14, 1915. His family was of old nobility and had maintained its independence even to the Napoleonic period. His father was Count Otto of Solms-Laubach and his mother, born a princess of Wied, was an aunt of Carmen Sylva, the poetess queen of Roumania. She was also a niece of that Prince Maximilian of Wied-Neuwied whose name is familiar in botany from his effective explorations in Brazil early in the nineteenth century.

Count Solms, after early instruction by family tutors and in an elementary school, passed through the gymnasium at Giessen and entered the well-known university at the same place. It is said that his early inclination toward history and taste for natural science were nearly balanced, but that he was influenced toward the latter as a life work by Leuckhart's stimulating lectures on animal anatomy. From boyhood he seems to have had a passion for observing and collecting plants and it was toward botany rather than zoölogy that his impulse turned. Prompt in his decision, he left the University of Giessen after a single semester and went to Berlin to study with Alexander Braun. There he devoted himself — as he afterward was disposed to maintain, all too exclusively — to botany. He achieved his doctorate at Berlin in 1865, his dissertation dealing with the systematic position of the Genus *Lathraea*.

After several months of travel, during which he formed some lifelong friendships with notable botanists and gained acquaintance with the important botanical collections in Geneva and elsewhere, he went to the University of Halle whither he was attracted by de Bary and where he soon became instructor in botany. In 1872, during the reorganization of the University of Strasburg, de Bary was selected to head the botanical establishments of that institution. Doubtless through his influence Solms was called there too as Professor extraordinarius. In this capacity he served from 1872 to 1878. The epoch and place were remarkable in the history of botany. The great fame of de Bary brought to his laboratory a cosmopolitan group of students of exceptional talent, destined to make good and attain high distinction in divers fields and many lands. The evolutionary theory had brought new points of view. Improvements in microscope, microtome and staining technique had opened wide vistas for exploration. Here Count Solms passed the still formative years between instructorship and independent appointment. But little older than many of the talented band he was helping to guide he left an enduring impression upon them and retained through life their friendship and admiration.

In 1879 he was chosen to succeed Grisebach at Göttingen. Four years later he made a journey to the tropics which greatly broadened his experience and always remained to him a source of satisfaction. The Dutch had established an admirable laboratory at the Botanical Garden of Buitenzorg in Java. Under the able direction of Treub it

became a place of international hospitality. Solms was one of the first to avail himself of the unusual privileges thus offered. There he found a wealth of opportunity, particularly in plant anatomy, and there he was able to assemble much material both for his personal investigation and to furnish fascinating problems for his future students.

In 1888 Count Solms received an honor of the first magnitude, namely a call to the University of Berlin. This position, however, he accepted only reluctantly and almost immediately resigned in order to take one much less conspicuous, the botanical professorship at Strasburg, which had become vacant through the death of de Bary. It is believed that several motives led Solms to this course. Though social by nature he had a horror of large or formal gatherings and probably dreaded social contacts and especially court functions which his scientific distinction combined with his noble birth would have rendered unavoidable in a great city and imperial capital. On the other hand it is certain that he felt in the highest degree the honor of succeeding at Strasburg his revered master, whose work it became his ambition to continue. It is not improbable that he hesitated to assume the large administrative duties at Berlin through some doubt of his ability in this phase of scientific work and from preference for less interrupted personal research. Finally, he was of the Rhinelands by birth and traditions.

Whatever may have been the grounds for his decision, it was promptly made and so far as is known was never regretted. It is interesting to speculate on what might have occurred if Solms had held his appointment to Berlin University instead of making way for the later incumbent there who, copious in his personal output and endowed with exceptional talent for organization, took the direction of the Berlin Imperial Botanical Garden and Museum just when the colonial expansion of the German Empire opened correspondingly wide opportunities in descriptive science.

As he appeared to his students at Strasburg in the late eighties and early nineties Solms was a man of extraordinary energy and incessant activity. He was tall, erect, broad-shouldered but otherwise rather slender. With high forehead, fine nose, alert and friendly blue eyes, and copious reddish-brown hair and beard he would have been rather handsome had his carriage been more sedate, but he was loose-hung

and apt to assume in the eagerness of discussion awkward postures. His gait was vigorous but had nervous uncertainty. His clothes, excellent in quality, were conservatively chosen for comfort and with frank disregard of fashion. They were worn carelessly and often impatiently adjusted during conversation as when in the midst of an eager account of some recent theory or discovery he would suddenly interrupt himself to tie a shoe lace or give new centering to a cravat that had wandered far to the right or left.

On the lecture platform he was always clear and consecutive, often brilliant. His manner of delivery, however, had marked peculiarities. His voice was raised almost to a shout. He rapidly paced back and forth on the rostrum and his gesticulation was almost incessant and frequently violent. He handled illustrative specimens somewhat recklessly and occasionally to their damage. But all this was quickly forgotten by his listeners who were soon attentive to the compelling logic of his argument. Though facts were subjected to critical and ruthless examination, they were never the end in themselves. Their interest lay in what they proved. This was the secret by which he so perfectly held the attention of his hearers. He often told them what they had previously read or heard, but always imparted to such matter new interest by his explanations and interpretation.

He devoured and digested scientific literature in vast quantities, and had the rare ability of selective assimilation. Matter diffusely recorded by colleagues in works of tedious detail he acquired with great rapidity and presented in condensed form, clarified and arranged with admirable sense of values.

Such were his gifts as a lecturer. It is unfortunate that in his writings he did not attain the same lucidity. An almost morbid regard for precision, combined with anxiety to accord all possible credit to previous exponents of his subject, led him to overload his own composition with quotations. As a result, his writings, instead of having the consistency of his speech, present an often bewildering variety of contrasting views. They require close reading.

As a director of laboratory research he was friendly in his interest and uncommonly generous in supplying material of value often from his personal stores, but he was not very suggestive. Indeed, he purposely left his students to devise their own methods and work out their own salvation. When they gave evidence of progress, his gratifi-

cation was immediate and doubtless greater because their discoveries were their own rather than the reflected result of promptings on his part.

His personal investigations were at all times enthusiastically pursued. So great was his eagerness in them that he quickly surrounded himself by a tremendous array of books, papers, specimens and apparatus, which soon left him only some small corner of a desk or laboratory table on which to write. Though his manual cleverness seemed subject to handicap from nervous uncertainty in his movements, he was not lacking in skill. He had, furthermore, boundless courage in attacking problems of the most baffling difficulty, as in studying the anatomy of the rarest fossil plants or revising extant genera like *Pandanus* or *Rafflesia*.

Compared with his compatriots, most of whom were already tending strongly toward specialization, Solms had great breadth of interest. Many of his early studies had to do with the anatomical and developmental traits of algae and fungi. He wrote on certain geographic aspects of the bryophytes. He published repeatedly on the screw-pines. His most notable taxonomic work concerned the phanerogamic parasites on which he became the world's greatest authority and concerning which he collaborated in systematic works of the first importance, such as the *Flora Brasiliensis*, the *Natürliche Pflanzenfamilien*, and *Pflanzenreich*. Much of his most remarkable work was in the realm of paleophytology and there he was one of the first to bring to bear upon the structure and classification of vegetable fossils a comprehensive knowledge of the anatomy and taxonomy of extant groups. He took more than an incidental interest in problems of variation and those presented by plants of cultivation.

In assuming the duties of de Bary he fell heir to the editorship of the *Botanische Zeitung*, which he patiently directed through many years with the minimum of change in its already rather archaic form.

Solms's death, occurring at a time when war was a grim actuality and men's thoughts were distracted from all else, met with far less notice than would otherwise have been the case. Biographical accounts of him have been few, but one of them has been of exceptional excellence, namely that by his associate, intimate friend, and official successor, Prof. Ludwig Jost¹—a sketch replete with scientific insight,

¹ *Berichte der Deutschen Botan. Gesellsch.*, vol. xxxiii, pp. (85)–(112).

photographic portraiture, and affectionate touches of humor. From England also there have been worthy tributes to his memory by Prof. D. H. Scott¹ and Dr. Otto Stapf.²

Fond of travel and facile in acquiring foreign languages Count Solms made frequent visits to Switzerland and Italy and in his active years went not rarely to England where he was specially interested by the superb collections of plants — living, dried and fossil. He became very fond of many of his English colleagues and spoke of them in terms of high regard. In matters of race, national customs, religious preferences or political views he was uniformly tolerant, though often facetious in comment. Toward a very few of his contemporary scientists he was clearly antipathetic but seemed less irritated by the difference of their views than by the tediousness with which these were presented. A bore he could not abide.

Count Solms never married. His household was long directed by his sister and after her death by two nieces, the Countesses Sophie and Anna of Solms-Rödelheim. When he had directed the Botanical Institute at Strasburg for twenty years he retired from active service and acquired an excellent house overlooking the Botanical Garden. Here he passed his remaining years in great comfort, often visiting the scenes of his former activities and, so far as his health permitted, continuing his investigations. He remained cheerful, was interested in and sympathetic with the work of his successor, and was jocose regarding the timorous beginnings of coeducation just then taking place in the scientific laboratories of Strasburg.

At his home, which was one of simplicity and great charm, he and his nieces practised a quiet and delightful hospitality. A notable member of the household was a parrot, an accomplished and gentlemanly bird, that came to the table on the Count's forefinger and there, supplied with napkin and appropriate small dishes, did full justice to a *table d'hôte*, partaking of all courses from soup to dessert, though showing particular enthusiasm for the salad.

Seldom has a man of Solms's rank pursued science with such fine devotion. Even more rarely has a born scientist possessed interests of such breadth or a personality so striking.

B. L. ROBINSON.

¹ Nature, xcvi, p. 541 (1916), reprinted in Bot. Gaz., xli, p. 433 (1916).

² Proc. Linn. Soc., 128th Session, pp. 71-73.

CHARLES PROTEUS STEINMETZ (1865-1923).

Fellow in Class I, Section 4, 1911.

The sudden death of Dr. C. P. Steinmetz on October 26, 1923, at Schenectady, N. Y., has removed one of the most remarkable men in electrical engineering that the world has ever known. His life is a triumphant history of genius and energy, hampered by obstacles and physical disabilities.

He was born in Breslau, Germany, on April 9, 1865. His father was an official of that city and gave the boy a good education. Charles entered the University of Breslau in 1882, specializing in mathematical and physical sciences. Later, he transferred his studies to the University of Berlin; but his stay there was short. He manifested the strong individuality of his character and warmly espoused the cause of socialism. This brought him under the ban of the German government authorities, to whom socialistic propaganda were iniquities of the most glaring type. It was necessary for young Steinmetz to leave Germany promptly, for political reasons, and in 1888 he went to the Zurich Polytechnic School, where he studied mechanical engineering. In the following year, he decided to try his fortune in America. He was needy and had to borrow his passage money from the friend who suggested the venture. Furthermore, he was handicapped physically because he was humpbacked; but he was young, energetic and full of hope.

Steinmetz reached New York in 1889, with a letter of introduction from the *Elektrotechnische Zeitung*, a leading electrical journal of Berlin. He found employment as a draughtsman with the Eickemeyer Manufacturing Co. of Yonkers, N. Y. He was soon promoted by them to the office of electrical designer, and put in charge of electrical work in their factory. He had never had any practical electric experience in Germany; but he had had, as we have seen, a good fundamental training in physics and mathematics.

In the year following his arrival in New York, he made his first contribution to electrotechnical literature, "Notes on the Law of Hysteresis" in the *Electrical Engineer*. In that year he also became an Associate of the American Institute of Electrical Engineers. He contributed his first papers to that Institute in 1892, on the laws of

hysteresis. These papers showed remarkable grasp and originality. They were the forerunners in the Institute Proceedings of a long series of technical papers, many of which have become classically famous. His writings flowed into a number of channels in electrical literature and soon aroused world-wide attention. Commencing with a paper in the Proceedings of the International Electrical Congress of Chicago (August 1893), on "Complex Quantities and Their Use in Electrical Engineering," a subject then relatively young, he proceeded to develop and expand the applications of complex numbers to electrical machinery and circuits in a manner that was very remarkable. He was soon a familiar figure at the meetings and discussions of the American Institute of Electrical Engineers. He would stand with his knee on a chair, and his arm on the back of the same, his large head low on his shoulders, and a cigar in the left corner of his mouth, his eyes flashing with vivacity and intelligence. He would thus speak on the topic of the evening for perhaps twenty minutes, with the audience spell-bound. His remarks were always keen, clear and to the point. He held the rare combination of a mathematical mind, a practical sense of realities, and a power of clear exposition. There was no one who could address a meeting of electrical engineers with such magnetic effect as Steinmetz. He was elected President of the American Institute of Electrical Engineers for the year 1901-02. He was also President of the Illuminating Engineering Society in 1915-16.

When the Eickemeyer electrical interests were acquired by the General Electric Co. in 1893, Steinmetz joined that company, and was attached to the computing department of the Lynn works. Here he rapidly distinguished himself, and in a few months became the leading spirit in the design and computation of alternating-current machinery. In 1894 the headquarters of the General Electric Co. was transferred to Schenectady, N. Y., and Steinmetz organized there the designing department. He also developed a research department. For nearly thirty years he was the chief consulting engineer of the General Electric Co., and his responsibilities were often very large. During this long period of work, he took out nearly two hundred United States patents for electrical inventions. They were not, in general, of a sensational nature, but they were sound and serviceable. Although his papers in the technical journals were most remarkable on the theoretical side, his practical skill in design and invention was very noteworthy.

In 1902, Steinmetz was appointed professor of electro-physics at Union College, Schenectady, and he held this chair until his death. He received the honorary degree of M.A. from Harvard University in 1902, and that of Ph.D. from Union College in 1903. He was elected a non-resident member of the American Academy of Arts and Sciences October 11, 1911.

Dr. Steinmetz was the author of some ten well-known books on electrotechnics, including electric illumination. Some of these have been translated into other languages. They are mathematical and nearly all utilize and develop complex arithmetic. While occasionally employing the calculus and differential equations, they are mainly written in simple algebra. His mathematics was like his reasoning, direct and without circumlocution. His literary style was quite characteristic, terse and explicit. Although he acquired a thorough conversational knowledge of the English language, his writings contain certain small traces of foreign idiomatic construction, imported from the German. So widespread has become the study of his books, that a few of these Steinmetzian phrases have become current in modern American electrotechnical literature. His most recent book *Relativity and Space*, published in 1923, is perhaps the best extant exposition of Einsteinian philosophy in terms that the engineer is able to grasp.

The pervasive energy of his mentality vented itself in other channels than engineering. He successfully entered the fields of civics and politics in his city of residence. He had been President of the Schenectady Board of Education since 1912, and also President of the Schenectady Common Council since 1916. He was always ready to devote time and energy to lectures and addresses in various American cities, on technical, scientific and sociological topics. He expounded the beliefs that the progress of civilization depends greatly on the development of electric power distribution, and also on the elimination of waste in material distribution.

As a personality, he was noteworthy and impelling. His brilliant eyes, short bushy hair and the characteristic attitudes associated with his physical deformity, fascinated attention. No one who had once seen Steinmetz speak could ever forget him. He was an inveterate smoker, and the inevitable cigar is a prominent object in most of his portraits. He was also very fond of strong coffee. In all other

respects, however, he was most temperate in habits. He lived a bachelor's life, almost outside the pale of feminine society. He was cheerful, generous and kindly, fond of recreation in the open air, but cut off from sports except boating and canoeing. He was entirely free from disdain or affectation, and was approachable to every questioner, no matter how crude the question. He held strong opinions on many subjects and he enjoyed temperate debate. His strong individuality, however, resented rules and restrictions. In the General Electric Company's works, where the printed rules of non-smoking were abundantly displayed, the only exception, permitted by universal consent, was Dr. Steinmetz's cigar.

His bachelor home was an open house to many of his fellow-engineers, and he liked to see them enjoy it. He had special tastes and recreations. At one time, he kept a number of alligators as pets. He had a fine collection of cacti in his greenhouses and was well versed in their names, habitats and modes of living. He had a large aquarium containing plants and fish. A trap door and ladder gave access to a grotto below the water level, where, beside a large glass window, he could sit and smoke, while watching the slow-moving fishes and working out his problems.

His death occurred from heart failure, shortly after his return from a trip to a convention of the American Institute of Electrical Engineers on the Pacific Coast, where he had read a paper on "High-Voltage Insulation," the last of so long and notable a series of new contributions to engineering literature. He was still actively working and producing.

His death removes a great and unique personality from the ranks of electrical engineering, a genius, one out of many millions of men, hampered by a deformed body but endowed with a most energetic mind. A most highly individualistic man, he devoted his life to the theory and practice of electrical engineering. All electrical engineers realize how great was his triumph.

A. E. KENNELLY.

American Academy of Arts and Sciences

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CLASS II.—*Natural and Physiological Sciences.*—190.

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Nathan Matthews	Boston
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Elijah Clarence Hills	Berkeley, Cal.
William Henry Holmes	Washington, D. C.
Edward Washburn Hopkins	New Haven, Conn.
Joseph Clark Hoppin	Pomfret, Conn.
Albert Andrew Howard	Cambridge
William Guild Howard	Cambridge
Aleš Hrdlička	Washington, D. C.
Eugene Xavier Louis Henry Hyvernatt	Washington, D. C.
Carl Newell Jackson	Cambridge
Hans Carl Gunther von Jagemann	Cambridge
James Richard Jewett	Cambridge
Alfred Louis Kroeber	Berkeley, Cal.
Kirsopp Lake	Cambridge
Henry Roseman Lang	New Haven, Conn.
Charles Rockwell Lanman	Cambridge
John Livingston Lowes	Cambridge
David Gordon Lyon	Cambridge
Clifford Herschel Moore	Cambridge
George Foot Moore	Cambridge
Hanns Oertel	Munich, Germany
Chandler Rathfon Post	Cambridge
Edward Kennard Rand	Cambridge
George Andrew Reisner	Cambridge
Edward Robinson	New York, N. Y.
Fred Norris Robinson	Cambridge
Rudolph Schevill	Berkeley, Cal.
Edward Stevens Sheldon	Cambridge
Herbert Weir Smyth	Cambridge
Franklin Bache Stephenson	Washington, D. C.

Charles Cutler Torrey	New Haven, Conn.
Alfred Marston Tozzer	Cambridge
Clark Wissler	New York, N. Y.
James Haughton Woods	Cambridge

CLASS III., SECTION III.—*Political Economy and History.*—47.

Wilbur Cortez Abbott	Cambridge
Brooks Adams	Quincy
George Burton Adams	New Haven, Conn.
Charles McLean Andrews	New Haven, Conn.
John Spencer Bassett	Northampton
Carl Lotus Becker	Ithaca, N. Y.
Charles Jesse Bullock	Cambridge
Thomas Nixon Carver	Cambridge
Edward Channing	Cambridge
John Bates Clark	New York, N. Y.
Archibald Cary Coolidge	Boston
Richard Henry Dana	Cambridge
Clive Day	New Haven, Conn.
Davis Rich Dewey	Cambridge
Ephraim Emerton	Cambridge
Henry Walcott Farnam	New Haven, Conn.
Max Farrand	New Haven, Conn.
William Scott Ferguson	Cambridge
Irving Fisher	New Haven, Conn.
Worthington Chauncey Ford	Cambridge
Edwin Francis Gay	New York, N. Y.
Frank Johnson Goodnow	Baltimore, Md.
Evarts Boutell Greene	Champaign, Ill.
Arthur Twining Hadley	New Haven, Conn.
Albert Bushnell Hart	Cambridge
Charles Homer Haskins	Cambridge
Isaac Minis Hays	Philadelphia, Pa.
Charles Downer Hazen	New York, N. Y.
George La Piana	Cambridge
Henry Cabot Lodge	Nahant
Abbott Lawrence Lowell	Cambridge

William MacDonald	New York, N. Y.
Charles Howard McIlwain	Cambridge
Roger Bigelow Merriman	Cambridge
Samuel Eliot Morison	Concord
William Bennett Munro	Boston
Charles Lemuel Nichols	Worcester
James Ford Rhodes	Boston
Michael I. Rostovtzeff	Madison, Wis.
William Milligan Sloane	New York, N. Y.
John Osborne Sumner	Boston
Frank William Taussig	Cambridge
Frederick Jackson Turner	Madison, Wis.
Claude Halstead Van Tyne	Ann Arbor, Mich.
George Grafton Wilson	Cambridge
George Parker Winship	Charles River
Allyn Abbott Young	Cambridge

CLASS III., SECTION IV.—*Literature and the Fine Arts.*—45.

Irving Babbitt	Cambridge
George Pierce Baker	Cambridge
William Sturgis Bigelow	Boston
Le Baron Russell Briggs	Cambridge
Charles Allerton Coolidge	Boston
Frederick Shepherd Converse	Boston
Samuel McChord Crothers	Cambridge
Wilberforce Eames	New York, N. Y.
Edward Waldo Emerson	Concord
William Emerson	Cambridge
Arthur Fairbanks	Cambridge
Frank Edgar Farley	Middletown, Conn.
Arthur Foote	Brookline
Edward Waldo Forbes	Cambridge
Kuno Francke	Gilbertsville, N. Y.
Daniel Chester French	New York, N. Y.
Horace Howard Furness	Philadelphia, Pa.
Robert Grant	Boston
Morris Gray	Boston

Chester Noyes Greenough	Cambridge
James Kendall Hosmer	Minneapolis, Minn.
Mark Antony DeWolfe Howe	Boston
Archer Milton Huntington	New York, N. Y.
George Lyman Kittredge	Cambridge
William Coolidge Lane	Cambridge
John Ellerton Lodge	Boston
Charles Martin Tornov Lœffler	Medfield
Charles Donagh Maginnis	Brookline
Allan Marquand	Princeton, N. J.
Albert Matthews	Boston
Harold Murdock	Brookline
William Allan Neilson	Northampton
William Lyon Phelps	New Haven, Conn.
Arthur Kingsley Porter	Cambridge
Herbert Putnam	Washington, D. C.
Denman Waldo Ross	Cambridge
Paul Joseph Sachs	Cambridge
John Singer Sargent	London, Eng.
Ellery Sedgwick	Boston
Henry Dwight Sedgwick	Cambridge
Richard Clipston Sturgis	Boston
Charles Howard Walker	Boston
Owen Wister	Philadelphia, Pa.
George Edward Woodberry	Beverly
Charles Henry Conrad Wright	Cambridge

FOREIGN HONORARY MEMBERS.—65.

(Number limited to seventy-five.)

CLASS I.—*Mathematical and Physical Sciences*.—25.SECTION I.—*Mathematics and Astronomy*.—8.

Johann Oskar Backlund	Petrograd
Arthur Stanley Eddington	Cambridge
Jacques Salomon Hadamard	Paris
Godfrey Harold Hardy	Oxford
Felix Klein	Göttingen
Tullio Levi-Civita	Rome
Charles Emile Picard	Paris
Charles Jean de la Vallée Poussin	Louvain

CLASS I., SECTION II.—*Physics*.—8.

Svante August Arrhenius	Stockholm
Albert Einstein	Berlin
Oliver Heaviside	Torquay
Sir Joseph Larmor	Cambridge
Hendrik Antoon Lorentz	Haarlem
Max Planck	Berlin
Sir Ernest Rutherford	Cambridge
Sir Joseph John Thomson	Cambridge

CLASS I., SECTION III.—*Chemistry*.—4.

Fritz Haber	Berlin
Henri Louis Le Chatelier	Paris
Wilhelm Ostwald	Leipsic
William Henry Perkin	Oxford

CLASS I., SECTION IV.—*Technology and Engineering*.—5.

Heinrich Müller Breslau	Berlin
Ferdinand Foch	Paris

Joseph Jacques Césaire Joffre	Paris
Vsevolod Evgenievich Timonoff	Petrograd
William Cawthorne Unwin	London

CLASS II.—*Natural and Physiological Sciences.*—22.SECTION I.—*Geology, Mineralogy, and Physics of the Globe.*—10.

Frank Dawson Adams	Montreal
Charles Barrois	Lille
Waldemar Christofer Brögger	Christiania
Sir Archibald Geikie	Haslemere, Surrey
Viktor Goldschmidt	Heidelberg
Albert Heim	Zürich
Emmanuel de Margerie	Paris
Gustaf Adolf Frederik Molengraaff	Delft
Sir William Napier Shaw	London
Johan Herman Lie Vogt	Trondhjem

CLASS II., SECTION II.—*Botany.*—4.

John Briquet	Geneva
Adolf Engler	Berlin
Ignatz Urban	Berlin
Hugo de Vries	Luntenen

CLASS II., SECTION III.—*Zoölogy and Physiology.*—4.

George Albert Boulenger	Brussels
Maurice Caullery	Paris
Sir Edwin Ray Lankester	London
George Henry Falkiner Nuttall	Cambridge

CLASS II., SECTION IV.—*Medicine and Surgery.*—4.

Rt. Hon. Sir Thomas Clifford Allbutt	Cambridge
Sir Thomas Barlow, Bart.	London
Francis John Shepherd	Montreal
Sir Charles Scott Sherrington	Oxford

CLASS III.—*Moral and Political Sciences*.—18.SECTION I.—*Theology, Philosophy and Jurisprudence*.—3.

Rt. Hon. Arthur James Balfour, Earl of Balfour . . .	Prestonkirk
Raymond Poincaré	Paris
Rt. Hon. Sir Frederick Pollock, Bart.	London

CLASS III., SECTION II.—*Philology and Archæology*.—6.

Wilhelm Dörpfeld	Athens
Henri Guy	Grenoble
Hermann Georg Jacobi	Bonn
Arthur Anthony Macdonell	Oxford
Alfred Percival Maudslay	Hereford
Ramon Menendez Pidal	Madrid

CLASS III., SECTION III.—*Political Economy and History*.—4.

Adolf Harnack	Berlin
Alfred Marshall	Cambridge
Henri Pirenne	Ghent
Rt. Hon. Sir George Otto Trevelyan, Bart.	London

CLASS III., SECTION IV.—*Literature and the Fine Arts*.—5.

Georg Brandes	Copenhagen
Thomas Hardy	Dorchester
Jean Adrien Antoine Jules Jusserand	Washington, D. C.
Rudyard Kipling	Burwash
Sir Sidney Lee	London

STATUTES AND STANDING VOTES

STATUTES

Adopted November 8, 1911: amended May 8, 1912, January 8, and May 14, 1913, April 14, 1915, April 12, 1916, April 10, 1918, May 14, 1919, February 8, April 12, and December 13, 1922, February 14, March 14, and October 10, 1923.

CHAPTER I

THE CORPORATE SEAL

ARTICLE 1. The Corporate Seal of the Academy shall be as here depicted:



ARTICLE 2. The Recording Secretary shall have the custody of the Corporate Seal.

See Chap. v. art. 3; chap. vi. art. 2.

CHAPTER II

FELLOWS AND FOREIGN HONORARY MEMBERS AND DUES

ARTICLE 1. The Academy consists of Fellows, who are either citizens or residents of the United States of America, and Foreign Honorary Members. They are arranged in three Classes, according to the Arts and Sciences in which they are severally proficient, and each Class is divided into four Sections, namely:

CLASS I. *The Mathematical and Physical Sciences*

- Section 1. Mathematics and Astronomy
- Section 2. Physics
- Section 3. Chemistry
- Section 4. Technology and Engineering

CLASS II. *The Natural and Physiological Sciences*

- Section 1. Geology, Mineralogy, and Physics of the Globe
- Section 2. Botany
- Section 3. Zoölogy and Physiology
- Section 4. Medicine and Surgery

CLASS III. *The Moral and Political Sciences*

- Section 1. Theology, Philosophy, and Jurisprudence
- Section 2. Philology and Archæology
- Section 3. Political Economy and History
- Section 4. Literature and the Fine Arts

ARTICLE 2. The number of Fellows shall not exceed Six hundred, of whom not more than Four hundred shall be residents of Massachusetts, nor shall there be more than Two hundred and ten in any one Class.

ARTICLE 3. The number of Foreign Honorary Members shall not exceed Seventy-five. They shall be chosen from among citizens of foreign countries most eminent for their discoveries and attainments in any of the Classes above enumerated. There shall not be more than Twenty-five in any one Class.

ARTICLE 4. If any person, after being notified of his election as Fellow, shall neglect for six months to accept in writing, or, if a Fellow

resident within fifty miles of Boston shall neglect to pay his Admission Fee, his election shall be void; and if any Fellow resident within fifty miles of Boston shall neglect to pay his Annual Dues for six months after they are due, provided his attention shall have been called to this Article of the Statutes in the meantime, he shall cease to be a Fellow; but the Council may suspend the provisions of this Article for a reasonable time.

With the previous consent of the Council, the Treasurer may dispense (*sub silentio*) with the payment of the Admission Fee or of the Annual Dues or both whenever he shall deem it advisable. In the case of officers of the Army or Navy who are out of the Commonwealth on duty, payment of the Annual Dues may be waived during such absence if continued during the whole financial year and if notification of such expected absence be sent to the Treasurer. Upon similar notification to the Treasurer, similar exemption may be accorded to Fellows subject to Annual Dues, who may temporarily remove their residence for at least two years to a place more than fifty miles from Boston.

If any person elected a Foreign Honorary Member shall neglect for six months after being notified of his election to accept in writing, his election shall be void.

See Chap. vii. art. 2.

ARTICLE 5. Every Fellow resident within fifty miles of Boston hereafter elected shall pay an Admission Fee of Ten dollars.

Every Fellow resident within fifty miles of Boston shall, and others may, pay such Annual Dues, not exceeding Fifteen dollars, as shall be voted by the Academy at each Annual Meeting, when they shall become due; but any Fellow shall be exempt from the annual payment if, at any time after his admission, he shall pay into the treasury Two hundred dollars in addition to his previous payments. Any Fellow shall also be exempt from annual dues who has paid such dues for forty years, or, having attained the age of seventy-five, has paid dues for twenty-five years.

All Commutations of the Annual Dues shall be and remain permanently funded, the interest only to be used for current expenses.

Any Fellow not previously subject to Annual Dues who takes up his residence within fifty miles of Boston, shall pay to the Treasurer within three months thereafter Annual Dues for the current year, failing which

his Fellowship shall cease; but the Council may suspend the provisions of this Article for a reasonable time.

Only Fellows who pay Annual Dues or have commuted them may hold office in the Academy or serve on the Standing Committees or vote at meetings.

ARTICLE 6. Fellows who pay or have commuted the Annual Dues and Foreign Honorary Members shall be entitled to receive gratis one copy of all Publications of the Academy issued after their election.

See Chap. x, art. 2.

ARTICLE 7. Diplomas signed by the President and the Vice-President of the Class to which the member belongs, and countersigned by the Secretaries, shall be given to Foreign Honorary Members and to Fellows on request.

ARTICLE 8. If, in the opinion of a majority of the entire Council, any Fellow or Foreign Honorary Member shall have rendered himself unworthy of a place in the Academy, the Council shall recommend to the Academy the termination of his membership; and if three fourths of the Fellows present, out of a total attendance of not less than fifty at a Stated Meeting, or at a Special Meeting called for the purpose, shall adopt this recommendation, his name shall be stricken from the Roll.

See Chap. iii.; chap. vi. art. 1; chap. ix. art. 1, 7; chap. x. art. 2.

CHAPTER III

ELECTION OF FELLOWS AND FOREIGN HONORARY MEMBERS

The procedure in the election of Fellows and Foreign Honorary Members shall be as follows:

Nominations to Fellowship or Foreign Honorary Membership in any Section must be signed by two Fellows of that Section or by three Fellows of any Sections, and sent to the Corresponding Secretary accompanied by a statement of the qualifications of the nominee and brief biographical data.

Notice shall be sent to every Fellow not later than the fifteenth of January in each year, reminding him that all nominations must be in

the hands of the Corresponding Secretary before the fifteenth of February following.

A list of the nominees, giving a brief account of each, with the names of the nominators, shall be sent to every Fellow with a request that he return the list with such confidential comments and indications of preference as he may choose to make.

All the nominations, with any comments thereon and with expressions of preference on the part of the Fellows, shall be referred to the appropriate Class Committees, which shall canvass them, and report their recommendations in writing to the Council before the Stated Meeting of the Academy in April.

Elections of Fellows and Foreign Honorary Members shall be made by the Council before the Annual Meeting in May, and announced at that meeting.

Persons nominated in any year, but not elected, may be carried over to the list of nominees for the next year at the discretion of the Council, but shall not be further continued unless renominated.

See Chap. ii.; chap. vi. art. 1; chap. ix. art. 1.

CHAPTER IV

OFFICERS

ARTICLE 1. The Officers of the Academy shall be a President (who shall be Chairman of the Council), three Vice-Presidents (one from each Class), a Corresponding Secretary (who shall be Secretary of the Council), a Recording Secretary, a Treasurer, and a Librarian, all of whom shall be elected by ballot at the Annual Meeting, and shall hold their respective offices for one year, and until others are duly chosen and installed.

There shall be also twelve Councillors, one from each Section of each Class. At each Annual Meeting three Councillors, one from each Class, shall be elected by ballot to serve for the full term of four years and until others are duly chosen and installed. The same Fellow shall not be eligible for two successive terms.

The Councillors, with the other officers previously named, and the Chairman of the House Committee, *ex officio*, shall constitute the Council.

See Chap. x. art. 1.

ARTICLE 2. If any officer be unable, through death, absence, or disability, to fulfil the duties of his office, or if he shall resign, his place may be filled by the Council in its discretion for any part or the whole of the unexpired term.

ARTICLE 3. At the Stated Meeting in March, the President shall appoint a Nominating Committee of three Fellows having the right to vote, one from each Class. This Committee shall prepare a list of nominees for the several offices to be filled, and for the Standing Committees, and file it with the Recording Secretary not later than four weeks before the Annual Meeting.

See Chap. vi. art. 2.

ARTICLE 4. Independent nominations for any office, if signed by at least twenty Fellows having the right to vote, and received by the Recording Secretary not less than ten days before the Annual Meeting, shall be inserted in the call therefor, and shall be mailed to all the Fellows having the right to vote.

See Chap. vi. art. 2.

ARTICLE 5. The Recording Secretary shall prepare for use in voting at the Annual Meeting a ballot containing the names of all persons duly nominated for office.

CHAPTER V

THE PRESIDENT

ARTICLE 1. The President, or in his absence the senior Vice-President present (seniority to be determined by length of continuous fellowship in the Academy), shall preside at all meetings of the Academy. In the absence of all these officers, a Chairman of the meeting shall be chosen by ballot.

ARTICLE 2. Unless otherwise ordered, all Committees which are not elected by ballot shall be appointed by the presiding officer.

ARTICLE 3. Any deed or writing to which the Corporate Seal is to be affixed, except leases of real estate, shall be executed in the name of the Academy by the President or, in the event of his death, absence, or inability, by one of the Vice-Presidents, when thereto duly authorized.

See Chap. ii. art. 7; chap. iv. art. 1, 3; chap. vi. art. 2; chap. vii. art. 1; chap. ix. art. 6; chap. x. art. 1, 2; chap. xi. art. 1.

CHAPTER VI

THE SECRETARIES

ARTICLE 1. The Corresponding Secretary shall conduct the correspondence of the Academy and of the Council, recording or making an entry of all letters written in its name, and preserving for the files all official papers which may be received. At each meeting of the Council he shall present the communications addressed to the Academy which have been received since the previous meeting, and at the next meeting of the Academy he shall present such as the Council may determine.

He shall notify all persons who may be elected Fellows or Foreign Honorary Members, send to each a copy of the Statutes, and on their acceptance issue the proper Diploma. He shall also notify all meetings of the Council; and in case of the death, absence, or inability of the Recording Secretary he shall notify all meetings of the Academy.

Under the direction of the Council, he shall keep a List of the Fellows and Foreign Honorary Members, arranged in their several Classes and Sections. It shall be printed annually and issued as of the first day of July.

See Chap. ii. art. 7; chap. iii. art. 2, 3; chap. iv. art. 1; chap. ix. art. 6; chap. x. art. 1; chap. xi. art. 1.

ARTICLE 2. The Recording Secretary shall have the custody of the Charter, Corporate Seal, Archives, Statute-Book, Journals, and all literary papers belonging to the Academy.

Fellows borrowing such papers or documents shall receipt for them to their custodian.

The Recording Secretary shall attend the meetings of the Academy and keep a faithful record of the proceedings with the names of the Fellows present; and after each meeting is duly opened, he shall read the record of the preceding meeting.

He shall notify the meetings of the Academy to each Fellow and by mail at least seven days beforehand, and in his discretion may also cause the meetings to be advertised; he shall apprise Officers and Committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy.

After all elections, he shall insert in the Records the names of the Fellows by whom the successful nominees were proposed.

He shall send the Report of the Nominating Committee in print to every Fellow having the right to vote at least three weeks before the Annual Meeting.

See Chap. iv. art. 3.

In the absence of the President and of the Vice-Presidents he shall, if present, call the meeting to order, and preside until a Chairman is chosen.

See Chap. i.; chap. ii. art. 7; chap. iv. art. 3, 4, 5; chap. ix. art. 6; chap. x. art. 1, 2; chap. xi. art. 1, 3.

ARTICLE 3. The Secretaries, with the Chairman of the Committee of Publication, shall have authority to publish such of the records of the meetings of the Academy as may seem to them likely to promote its interests.

CHAPTER VII

THE TREASURER AND THE TREASURY

ARTICLE 1. The Treasurer shall collect all money due or payable to the Academy, and all gifts and bequests made to it. He shall pay all bills due by the Academy, when approved by the proper officers, except those of the Treasurer's office, which may be paid without such approval; in the name of the Academy he shall sign all leases of real estate; and, with the written consent of a member of the Committee on Finance, he shall make all transfers of stocks, bonds, and other securities belonging to the Academy, all of which shall be in his official custody.

He shall keep a faithful account of all receipts and expenditures, submit his accounts annually to the Auditing Committee, and render them at the expiration of his term of office, or whenever required to do so by the Academy or the Council.

He shall keep separate accounts of the income of the Rumford Fund, and of all other special Funds, and of the appropriation thereof, and render them annually.

His accounts shall always be open to the inspection of the Council.

ARTICLE 2. He shall report annually to the Council at its March meeting on the expected income of the various Funds and from all

other sources during the ensuing financial year. He shall also report the names of all Fellows who may be then delinquent in the payment of their Annual Dues.

ARTICLE 3. He shall give such security for the trust reposed in him as the Academy may require.

ARTICLE 4. With the approval of a majority of the Committee on Finance, he may appoint an Assistant Treasurer to perform his duties, for whose acts, as such assistant, he shall be responsible; or, with like approval and responsibility, he may employ any Trust Company doing business in Boston as his agent for the same purpose, the compensation of such Assistant Treasurer or agent to be fixed by the Committee on Finance and paid from the funds of the Academy.

ARTICLE 5. At the Annual Meeting he shall report in print all his official doings for the preceding year, stating the amount and condition of all the property of the Academy entrusted to him, and the character of the investments.

ARTICLE 6. The Financial Year of the Academy shall begin with the first day of April.

ARTICLE 7. No person or committee shall incur any debt or liability in the name of the Academy, unless in accordance with a previous vote and appropriation therefor by the Academy or the Council, or sell or otherwise dispose of any property of the Academy, except cash or invested funds, without the previous consent and approval of the Council.

See Chap. ii. art. 4, 5; chap. vi. art. 2; chap. ix. art. 6; chap. x. art. 1, 2, 3; chap. xi. art. 1.

CHAPTER VIII

THE LIBRARIAN AND THE LIBRARY

ARTICLE 1. The Librarian shall have charge of the printed books, keep a correct catalogue thereof, and provide for their delivery from the Library.

At the Annual Meeting, as Chairman of the Committee on the Library, he shall make a Report on its condition.

ARTICLE 2. In conjunction with the Committee on the Library he shall have authority to expend such sums as may be appropriated by the Academy for the purchase of books, periodicals, etc., and for defraying other necessary expenses connected with the Library.

ARTICLE 3. All books procured from the income of the Rumford Fund or of other special Funds shall contain a book-plate expressing the fact.

ARTICLE 4. Books taken from the Library shall be receipted for to the Librarian or his assistant.

ARTICLE 5. Books shall be returned in good order, regard being had to necessary wear with good usage. If any book shall be lost or injured, the Fellow to whom it stands charged shall replace it by a new volume or by a new set, if it belongs to a set, or pay the current price thereof to the Librarian, whereupon the remainder of the set, if any, shall be delivered to the Fellow so paying, unless such remainder be valuable by reason of association.

ARTICLE 6. All books shall be returned to the Library for examination at least one week before the Annual Meeting.

ARTICLE 7. The Librarian shall have the custody of the Publications of the Academy. With the advice and consent of the President, he may effect exchanges with other associations.

See Chap. ii. art. 6; chap. x. art. 1, 2.

CHAPTER IX

THE COUNCIL

ARTICLE 1. The Council shall exercise a discreet supervision over all nominations and elections to membership, and in general supervise all the affairs of the Academy not explicitly reserved to the Academy as a whole or entrusted by it or by the Statutes to standing or special committees.

It shall consider all nominations duly sent to it by any Class Committee, and act upon them in accordance with the provisions of Chapter III.

With the consent of the Fellow interested, it shall have power to

make transfers between the several Sections, reporting its action to the Academy.

See Chap. iii. art. 2, 3; chap. x. art. 1.

ARTICLE 2. Seven members shall constitute a quorum.

ARTICLE 3. It shall establish rules and regulations for the transaction of its business, and provide all printed and engraved blanks and books of record.

ARTICLE 4. It shall act upon all resignations of officers, and all resignations and forfeitures of Fellowship; and cause the Statutes to be faithfully executed.

It shall appoint all agents and subordinates not otherwise provided for by the Statutes, prescribe their duties, and fix their compensation. They shall hold their respective positions during the pleasure of the Council.

ARTICLE 5. It may appoint, for terms not exceeding one year, and prescribe the functions of, such committees of its number, or of the Fellows of the Academy, as it may deem expedient, to facilitate the administration of the affairs of the Academy or to promote its interests.

ARTICLE 6. At its March meeting it shall receive reports from the President, the Secretaries, the Treasurer, and the Standing Committees, on the appropriations severally needed for the ensuing financial year. At the same meeting the Treasurer shall report on the expected income of the various Funds and from all other sources during the same year.

A report from the Council shall be submitted to the Academy, for action, at the March meeting, recommending the appropriation which in the opinion of the Council should be made.

On the recommendation of the Council, special appropriations may be made at any Stated Meeting of the Academy, or at a Special Meeting called for the purpose.

See Chap. x. art. 3.

ARTICLE 7. After the death of a Fellow or Foreign Honorary Member, it shall appoint a member of the Academy to prepare a biographical notice for publication in the Proceedings.

ARTICLE 8. It shall report at every meeting of the Academy such business as it may deem advisable to present.

See Chap. ii. art. 4, 5, 8; chap. iv. art. 1, 2; chap. vi. art. 1; chap. vii. art. 1; chap. xi. art. 1, 4.

CHAPTER X

STANDING COMMITTEES

ARTICLE 1. The Class Committee of each Class shall consist of the Vice-President, who shall be chairman, and the four Councillors of the Class, together with such other officer or officers annually elected as may belong to the Class. It shall consider nominations to Fellowship in its own Class, and report in writing to the Council such as may receive at a Class Committee Meeting a majority of the votes cast, provided at least three shall have been in the affirmative.

See Chap. iii. art. 2.

ARTICLE 2. At the Annual Meeting the following Standing Committees shall be elected by ballot to serve for the ensuing year:

(i) *The Committee on Finance*, to consist of three Fellows, who, through the Treasurer, shall have full control and management of the funds and trusts of the Academy, with the power of investing the funds and of changing the investments thereof in their discretion.

See Chap. iv. art. 3; chap. vii. art. 1, 4; chap. ix. art. 6.

(ii) *The Rumford Committee*, to consist of seven Fellows, who shall report to the Academy on all applications and claims for the Rumford Premium. It alone shall authorize the purchase of books, publications and apparatus at the charge of the income from the Rumford Fund, and generally shall see to the proper execution of the trust.

See Chap. iv. art. 3; chap. ix. art. 6.

(iii) *The Cyrus Moors Warren Committee*, to consist of seven Fellows, who shall consider all applications for appropriations from the income of the Cyrus Moors Warren Fund, and generally shall see to the proper execution of the trust.

See Chap. iv. art. 3; chap. ix. art. 6.

(iv) *The Committee of Publication*, to consist of three Fellows, one from each Class, to whom all communications submitted to the

Academy for publication shall be referred, and to whom the printing of the Proceedings and the Memoirs shall be entrusted.

It shall fix the price at which the Publications shall be sold; but Fellows may be supplied at half price with volumes which may be needed to complete their sets, but which they are not entitled to receive gratis.

Two hundred extra copies of each paper accepted for publication in the Proceedings or the Memoirs shall be placed at the disposal of the author without charge.

See Chap. iv. art. 3; chap. vi. art. 1, 3; chap. ix. art. 6.

(v) *The Committee on the Library*, to consist of the Librarian, *ex officio*, as Chairman, and three other Fellows, one from each Class, who shall examine the Library and make an annual report on its condition and management.

See Chap. iv. art. 3; chap. viii. art. 1, 2; chap. ix. art. 6.

(vi) *The House Committee*, to consist of three Fellows, who shall have charge of all expenses connected with the House, including the general expenses of the Academy not specifically assigned to the care of other Committees or Officers.

See Chap. iv. art. 1, 3; chap. ix. art. 6.

(vii) *The Committee on Meetings*, to consist of the President, the Recording Secretary, and three other Fellows, who shall have charge of plans for meetings of the Academy.

See Chap. iv. art. 3; chap. ix. art. 6.

(viii) *The Auditing Committee*, to consist of two Fellows, who shall audit the accounts of the Treasurer, with power to employ an expert and to approve his bill.

See Chap. iv. art. 3; chap. vii. art. 1; chap. ix. art. 6.

ARTICLE 3. The Standing Committees shall report annually to the Council in March on the appropriations severally needed for the ensuing financial year; and all bills incurred on account of these Committees, within the limits of the several appropriations made by the Academy, shall be approved by their respective Chairmen.

In the absence of the Chairman of any Committee, bills may be approved by any member of the Committee whom he shall designate for the purpose.

See Chap. vii. art. 1, 7; chap. ix. art. 6.

CHAPTER XI

MEETINGS, COMMUNICATIONS, AND AMENDMENTS

ARTICLE 1. There shall be annually eight Stated Meetings of the Academy, namely, on the second Wednesday of October, November, December, January, February, March, April and May. Only at these meetings, or at adjournments thereof regularly notified, or at Special Meetings called for the purpose, shall appropriations of money be made or amendments of the Statutes or Standing Votes be effected.

The Stated Meeting in May shall be the Annual Meeting of the Corporation.

Special Meetings shall be called by either of the Secretaries at the request of the President, of a Vice-President, of the Council, or of ten Fellows having the right to vote; and notifications thereof shall state the purpose for which the meeting is called.

A meeting for receiving and discussing literary or scientific communications may be held on the fourth Wednesday of each month, excepting July, August, and September; but no business shall be transacted at said meetings.

ARTICLE 2. Twenty Fellows having the right to vote shall constitute a quorum for the transaction of business at Stated or Special Meetings. Fifteen Fellows shall be sufficient to constitute a meeting for literary or scientific communications and discussions.

ARTICLE 3. Upon the request of the presiding officer or the Recording Secretary, any motion or resolution offered at any meeting shall be submitted in writing.

ARTICLE 4. No report of any paper presented at a meeting of the Academy shall be published by any Fellow without the consent of the author; and no report shall in any case be published by any Fellow in a newspaper as an account of the proceedings of the Academy without the previous consent and approval of the Council. The Council, in its discretion, by a duly recorded vote, may delegate its authority in this regard to one or more of its members.

ARTICLE 5. No Fellow shall introduce a guest at any meeting of the Academy until after the business has been transacted, and espe-

cially until after the result of the balloting upon nominations has been declared.

ARTICLE 6. The Academy shall not express its judgment on literary or scientific memoirs or performances submitted to it, or included in its Publications.

ARTICLE 7. All proposed Amendments of the Statutes shall be referred to a committee, and on its report, at a subsequent Stated Meeting or at a Special Meeting called for the purpose, two thirds of the ballot cast, and not less than twenty, must be affirmative to effect enactment.

ARTICLE 8. Standing Votes may be passed, amended, or rescinded at a Stated Meeting, or at a Special Meeting called for the purpose, by a vote of two thirds of the members present. They may be suspended by a unanimous vote.

See Chap. ii. art. 5, 8; chap. iii; chap. iv. art. 3, 4, 5; chap. v. art. 1; chap. vi. art. 1, 2; chap. ix. art. 8.

STANDING VOTES

1. Communications of which notice has been given to either of the Secretaries shall take precedence of those not so notified.

2. Fellows may take from the Library six volumes at any one time, and may retain them for three months, and no longer. Upon special application, and for adequate reasons assigned, the Librarian may permit a larger number of volumes, not exceeding twelve, to be drawn from the Library for a limited period.

3. Works published in numbers, when unbound, shall not be taken from the Hall of the Academy without the leave of the Librarian.

4. The Council, under such rules respecting nominations as it may prescribe, may elect as Associates of the Academy a limited number of men of mark in affairs or of distinguished service in the community.

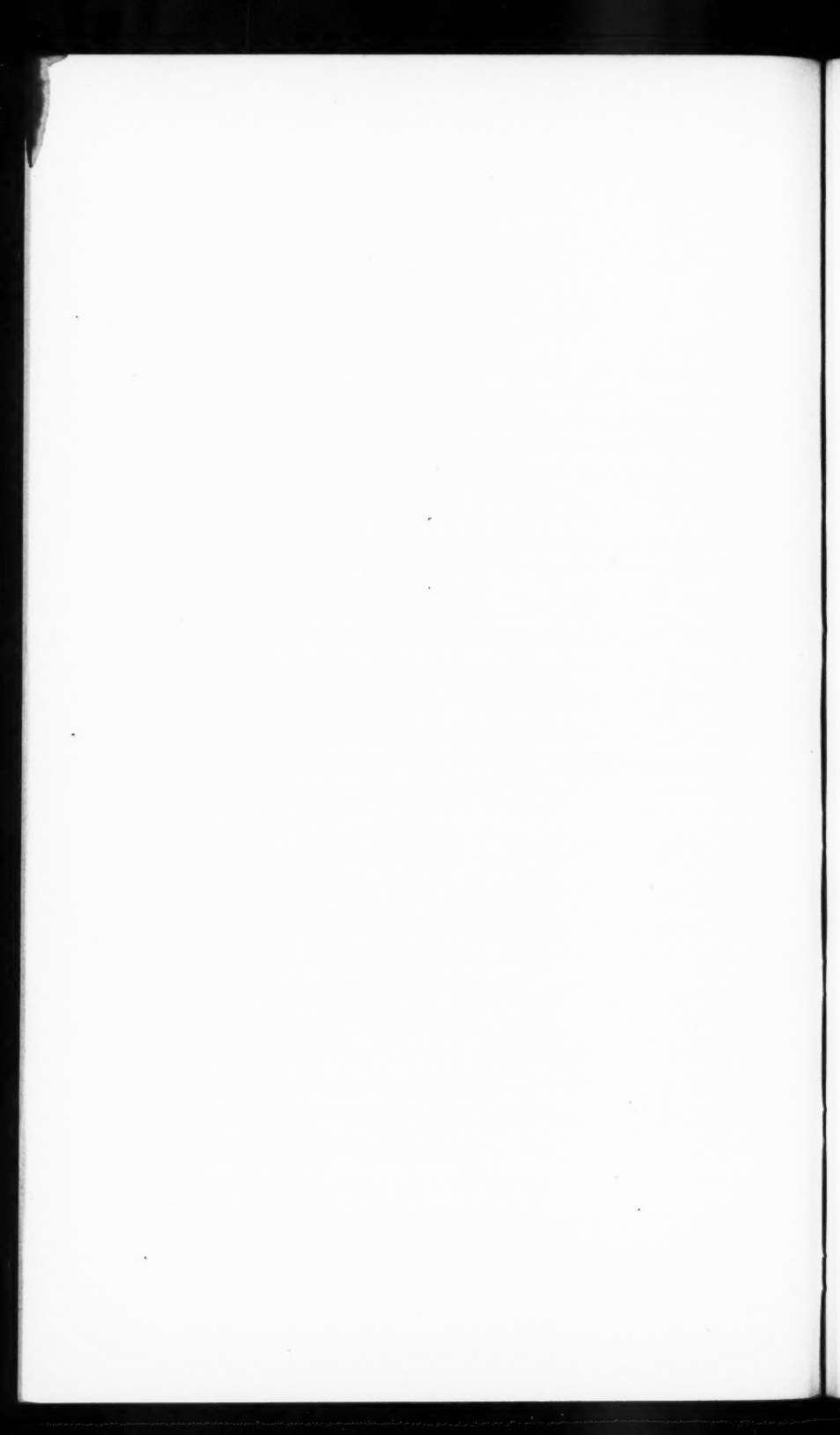
Associates shall be entitled to the same privileges as Fellows, but shall not have the right to vote.

The admission fee and annual dues of Associates shall be the same as those of Fellows residing within fifty miles of Boston.

5. Communications offered for publication in the Proceedings or Memoirs of the Academy shall not be accepted for publication before the author shall have informed the Committee on Meetings of his readiness, either himself or through some agent, to use such time as the Committee may assign him at such meeting as may be convenient both to him and to the Committee, for the purpose of presenting to the Academy a general statement of the nature and significance of the results contained in his communication.

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